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AUG. 30, 1954

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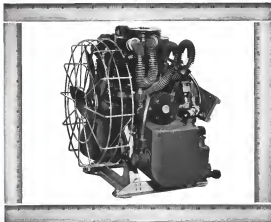
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NATION-WIDE SALES and SERVICE

AERO DESIGN AND ENGINEERING COMPANY

TULSAE AIRPORT, OKLAHOMA CITY, OKLAHOMA

Domestic

Third AID Stylbank Douglas Aircraft Co.'s lightweight Navy bomber now will be rolling off the production line at El Segundo, Calif.—two weeks ahead of schedule. It will be assigned to an aircraft carrier for tests. Both the line and overall AID now are in dropping tests at Edwards AFB. A company spokesman says Douglas has several sizable contracts, expects AID production to be stepped up considerably throughout the balance of 1954 and the beginning of 1955.

First production GR34, General's 34-15 modified to launch and retrieve a Republic RF-34 for long-range delivery of atomic bombs at some speed (Aerospace Week Aug. 31, 1954, p. 13) has started flight tests at the company's Ft. Worth plant.

Boeing B-47C warplanes get bombards and B2-47C photo reconnaissance planes are being equipped with 6,000 lb thrust General Electric J45-25 engines, giving the six-engine aircraft 50% more power than the XB-47 when it made its first flight seven years ago.

First production AID flew prototype from Miami, Calif., to Norfolk, Va., in 4 hr 45 min on a routine delivery flight of the twin jet Douglas bomber. Average speed for the 2,537-mile flight 100 mph. It will be assigned to the Navy at Norfolk for special reconnaissance missions.

Republic Aviation Corp. has laid off approximately 1,000 production workers in a slowdown of F-86F and F-4F output to permit the company to reorganize its production of F-86 Thunderbolt and Thunderbolt II at Farmdale, N. Y.

First P-500 B-2C War Hawk copy has been delivered to U. S. Army. Copies of carrying 20 troops or 16 tons it is powered by a 1,425-hp Wright R-360.

First Bell 485-1 copter was turned over finally to the Navy Aug. 18, then left the Ft. Worth, Tex., plant for a flight to Naval Air Test Center, Patuxent, Md.

National Airlines has purchased two Caravelle 340 from Pan American World Airways, increasing NAL's fleet of the five-engine transports to 18.

Aerovis aircraft production, engineering tests are being conducted at Con-



British Test New Lightweight Jet Fighter

Fulham Aircraft's prototype Cent, named the Midge, is reported to attain supersonic speeds when powered by designed by Fulham Engines (see page 10). The 14-ft-long plane was flown for the first time Aug. 18. The photo of the Midge, reproduced by courtesy of the British publication, The Aeroplane, shows the aircraft's shock-suppressing boom. Gross weight is about 4,500 lb. Wing sweep is 40 deg.

star's P1. Worth plant with a small, lower power research reactor loaned by the Air Force.

Boeing's DC-3 struck a power line and crashed last week, while approaching Miami City, Fla., during a blizzard. The aircraft, 11 years old, was the 79th produced since built, Boeing's first biplanes since 1935.

Two-engine biplane acquisition will be manufactured under license by newly formed Royal Aircraft Corp., a wholly owned subsidiary of Kaman & Taylor Corp., Middletown, Conn. Called the Royal Eagle, the biplane will be built for \$15,000-\$20,000 and has been ordered by CNA, Aerospace and will be made by the craft's designer, Pugh & Co., Inc., and shipped to U. S. All other components will be made in the country.

Pacific Aerospace Corp. will support and repair USAF C-47s and C-119s, and G-119s as reported by Aerospace Week (Aug. 23, p. 7).

Air Force Assoc. elected John R. Allen, former Assistant Secretary of Cassinair for Airworthiness, president at its 25th convention. New AFAs directors: Charles W. Porek, Baltimore; George D. Thiede, Hyattsville, Md.; and Walter E. Booney, Washington, D. C.

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Financial

Carroll Wright Corp., Wood Ridge, N. J., has declared a dividend of 25 cents a common share, payable Sept. 23 to holders of record Sept. 7, and a third quarter dividend of 50 cents a share on Class A that previously was declared will be payable the next day to holders of record Sept. 1. Several earlier common dividends had been 15 cents a share.

International

KLM Royal Dutch Airlines DC-6B crashed in the North Sea 10 mi off Dutch coast on New York flight, killing 21 persons aboard.

English Electric P11 twinjet interceptor (Aerospace Week, Aug. 16, p. 25) has exceeded Mach 1 in level flight several times, becoming first British supersonic aircraft.

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August 30, 1954

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FLYING BRACKETS EXTENDED under nose and beneath fuselage rear, new Grumman FV-9 Tiger prototype, slows down to have its pattern ideas solidified by being painted white (photos below). Superimposed in level flight, the Tiger has a 7,100-hp thrust plus Wright J67 W-1.

Design Highlights Of New Navy Grumman Tiger

"COKE BOTTLE" FUSELAGE says as it the wing back to provide optimum drag characteristics at high speeds. Lowest fuselage tail is opened as a jet pierce, all movable surface of control surfaces, the elevator because operates when the landing flap are lowered. Although bearing an FV-9 wing designation, the new Tiger is a completely new design. Production plans will be fitted with an afterburner. Grumman has a \$40-million development and production contract for the FV-9, to be built at Bethpage, N. Y., and completed at the company's new facility at Pomona, N. Y. (Aviation Week Aug. 23, p. 26 for engineering story)

MAIN WHEELS retract forward into belly, dual nosewheel fold back. Extremely thin wing and tail sections work about Grumman



LARGE INTAKES for Wright J67 W-1 are on sides of fuselage, a duplicate duct provides PWFs, which have intake at wing roots.



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WHO'S WHERE

In the Front Office

William M. Robinson will serve as administrator of Civil Aeronautics Administration's Second Region Sept. 1 to become executive vice president and administrator of United States International School of Aviation, Miami.

Samuel B. Williams, current editor of McGraw-Hill's Electrical World, will start Aug. 31 as executive to the board chairman of Schenck Electric Products Inc., New York.

Ed P. Riley has been elected vice president of Chicago of Thompson Products Turbine Div., Aerospace and Commercial Parts Division in Cleveland, and Charles W. Oby is vice president and general manager of Michelson operations. New division managers: Frank T. Nagel, services; John B. Galt, commercial products; and William F. Davis, turbine drive.

Charles Pennell has been appointed vice president of Cook Electric Co., Chicago.

Alfred A. Gannon, former of General Aircraft Engineering, a new vice president of American of Louisiana, La., 1800 Spring Street, N. Y.

Changes

Joseph Tipton has been promoted to director of CAA's Office of Federal Affairs, will be succeeded as deputy director by David D. Thomas. Other CAA changes: Robert F. Hensley, deputy regional administrator in New York; Kent B. Olson, assistant regional administrator in Houston; Paul Neidinger, foreign consultant with the international region; and Herbert Deppert, assistant to regional administrator in New York.

Robert E. Tibbitts is general manager of Air Associates, new International Division, Everloose, N. J. F. C. Becker has become general manager of the national aviation supply branch.

Leifur Elsson has been appointed general manager of the Aircraft Service Division of Lear, Inc., Santa Monica, Calif. Other changes: Allen H. Bels, assistant vice president manager; Robert Berry, Jr., military sales manager of the Lear Division.

Andrew J. Erickson has become director of Vaco Corporation of America's new aviation test section at USAF's Ames Research Center, Dayton, Ohio.

Art Lavett, Jr., has been named industrial relations director for Permutit Air Corp., Los Angeles.

Honors and Elections

May Gen. John S. Mills, USAF Assistant Deputy Chief of Staff, has been named the distinguished service medal for "exceptionally meritorious service while commander of the Special Weapons Center, Albuquerque, N. M., during 1951-54."

Dr. J. E. Hubbard, director of Stanford Research Institute, has succeeded to the presidency of Eta Rho Eta, electrical engineering honor society.

INDUSTRY OBSERVER

►Carnegie-Wright Corp.'s T40, turbo-prop aircraft from C-W's jet development will begin flight tests soon on a 3,191 foot test bed at Calhoun Airport, N. J.

►Engineering estimates say reduction in jet landing speed from 130 mph to 115 mph, would shorten the landing distance as much as a device providing 90% reverse thrust.

►British Overseas Airways Corp. appears to be more interested in the Conquest-powered Vickers 1000, commercial version of the Valiant bomber, than it is in the Conquest 4, powered by the de Havilland Gyron, a turbo-prop engine. Conquest is a Rolls-Royce engine variant.

►Boeing's 707, in the event of explosive development, could develop at a rate of 10,000 ft./min., company engineers say. Eventually it will be possible to lower the landing gear on the Stratojet at a speed of 516 knots (602 mph) to serve as its hook.

►Pitt and its pilot in Boeing's B-52 will open downward while other new machines open upward.

►Due jet transport, of the type now appearing, could replace in terms of gross weight a 10 C-54s, three low cost C-77s, three low cost C-119s and two to three C-47s with a 2,300 gross weight range, says Lt. Gen. Joseph Smith, Military Air Transport commander. Smith says that a jet transport, flying 140 hours a month, can deliver about 900 passengers a month to Europe while a C-54 can deliver about 170 and a C-97 and a C-119 about 270 passengers.

►Allison T38 turbo-prop is promising operational trouble-free, avoiding oil-fuel failures on testings. Allison T40 on single-engine Navy aircraft 144 is promised (Aviation Week Aug. 23, p. 11).

►Military services would like to see more active participation in transport development organizations by major fixed-wing transport builders. Firms such as Convair, Douglas, Boeing and Lockheed have been told by the military that their skills and experience are needed in field where considerable experience and inexperience were being lost, demonstrated by several small, smaller firms. Major companies are cool because of engineering and economic problems.

►Fast growing interest in adhesives leading to synthetic resins and epoxi welding, as lightweight aircraft and missiles has led Permet Aircraft Co. to increase testing select aircraft firms with offer to become one of its primary accounts and technical know-how. Permet says it has spent eight years and \$2 million of government money perfecting a system that can save 15% to 30% in both cost and weight where the situation is designed for adhesive bonding. Company manufacturers resin blends but lacks facilities to take on extensive manufacturing in aircraft parts, such as large and small wings that must be made without parts that violate loss in flight.

►Pittsburgh Helicopters Corp.'s program to upgrade the H-31 Helicopter has progressed to the point where Bell Canada Air Force is taking delivery on 60 of its six aircraft ships. Company is releasing assembly line workers but is now itself and new business with both Navy and Air Force appears likely. USAF is considering award of contract for helicopter version of H-31.

►Boeing's B-52 jet bomber has "lost or exceeded" its performance specifications in many details, says Air Force Secretary Harold R. Telford.

►Pod-mounted or nacelle-powered turbo-prop in transport aircraft are favored by Military Air Transport Service because of "difficulty and certain safety experience with gas turbines installed in the wings of various aircraft." Gen. Joseph Smith says. He adds that pod mounting increases structural, fuel and stability problems and reduces total weight required in the wing.

British Competition

Next critical point of British competition in the American commercial aircraft market will be turboprops. Among the British turboprop being considered for the U. S. market are the Bristol BE 25 with 5,000 shp, the Rolls Royce 109 with 1,700-4,000 shp, the Napier T340 with 3,000 shp, and the Rolls-Royce Dart with 3,500 shp.

In looking over current U. S. turboprop projects for engine use, turbine manufacturers are discouraged by the failure of U. S. engine makers to push development fast enough in turbine technology to produce an adequate operational experience to produce an adequate volume of maintenance and operations costs for commercial use.

USAF turboprop projects, spelled by Roger Lewis, Assistant Air Force Secretary for Material, aimed at accomplishing those objectives but now appear to be lagged down again.

Retaliation Views

Air Force also is naming of John Foster Dulles as "Aviation's Man of the Year" for 1954 was based on the Secretary of State's acceptance of arguments as an instrument of national policy and threat of "mutual retaliation" in case of attack. At the Dulles conference where he was honored on October 1, however, Dulles' deputy, Robert Murphy, spelled a little cold water on AFA's enthusiasm. "Caution for retaliation," Murphy said, "is not enough."

Warning against too great a dependence on military hardware, he suggested that more effort be put into increasing reliance behind the Iron Curtain. Murphy said it is impossible to draw a line and set an attack on the region will result in ground war.

AFA, on the other hand, said the Western World should draw a line and tell its enemies they will be shot should it dare to cross it.

USAF Reorganization

Confusion resulting from Senate failure to confirm appointment of Trevor Gardner to Assistant Secretary of the Air Force for Research and Development could delay further USAF reform of present line of organization in which research and development activities are expected to reach suggested status.

In a 1953 reorganization, the deputy chief of staff for development was subordinated to the deputy chief of staff for research. It now appears that the development branch, Lt. Gen. Donald L. Park, is headed toward equal status with Lt. Gen. Stuart L. Butler, the current deputy.

Revised legislation—AFR 212 and 214—states that when it is achieved the two offices will coordinate on all major weapons systems and coordinate in the decision to shift project responsibility from ARDC to AMC at the project time.

Both agencies hold seats in the Air Force Council.

AFA Reserve Policy

Complete removal of Air Force-AFA position on federalization of the Air National Guard was expected

in a cooperation resolution disapproving the suggestion, advanced recently at the Pentagon with a favorable nod from Defense Secretary Wilson.

A few days ago, when the AFA returns were sent (and many had just made the transition from AAF to National Guard and reserve units), the association signed federalization of ANG.

AFA's 1954 resolution lines their organization up with National Guard units and various reserve groups for the coming hot and heavy segment over law America's membership should be opened.

CAA Survey Study

Colin H. McIntosh, named by Commerce Secretary Fredrick Winslow to make a thorough study of the Census, McCannack and Dept survey report of the Civil Aeronautics Administration (AIA) on August 10, 1954, has directed himself of all other interests in order to devote his full time to the new assignment.

Ryan's Successor?

While House members indicated the President is strongly considering Lila C. Newman, Los Angeles attorney, as a successor to Donald Ryan, Civil Aeronautics Board member who is expected to retire when his present term expires Dec. 31, Newman is a member of the law firm of Tappet, Newman, Yelken and Thomas, which handles the United Air Lines account in Los Angeles.

Gardner Nomination

Senate floor one confirmation of Trevor Gardner as Assistant Secretary of the Air Force for Research and Development is expected to move without any further delay. Gardner's nomination is expected to move forward in the Senate after a procedural review appointment to arrive at the newly created post until the next session of Congress when some confirmation action likely.

Failure to confirm the appointment during the closing week of the last session was the result of a misunderstanding between Sen. Brewster Hollenback and Majority Leader Keefe. Hollenback told Senator Winslow he had asked for a brief delay in consideration of Gardner's confirmation, but instead Keefe recommended it to the Senate. Gardner, where it had in terms been because the committee did not act until the final legislative push on the bill. Hollenback's request was made primarily because of brief and growing uneasiness to Gardner as Robert Hovde, Canadian-born lawyer on the J. Robert Oppenheimer.

AF Regulation Revision

Revised Air Force Regulations 2016, 255 and 253, covering weapons systems project offices and the activities of Air Material Command and Air Research and Development Command, have submitted AFA's "guide to the new" governing operations in AF's tools of war. New rules make it clear that once a weapon system is in production, ANG is the host-although ARDC can make recommendations in engineering change proposals. In the area of research and development, AMC provides advice for "necessary logistic support" in purchase of aircraft for ARDC.

—Washington staff



SALYEHETALL: Money is not important.



SYMINGTON: Spend more money.



HORDELAVO: Economy for leaders.

83rd Congress Baskrobe:

Airpower Wins, Civil Aviation Plans Lose

• Administration's 137-wing USAF program passes final session with token challenges from Democrats.

• Commercial air policy, spelled out by ACC, is blocked by strong opposition from legislators of both parties.

By Katherine Johnson

The Administration's civil aviation program confronted a wall of opposition from Republicans as well as Democrats in the recently adjourned final session of the Republican-controlled 83rd Congress. But the military support program passed through without any visible challenges from Democrats.

The year's political tone was "let's start moving," accompanied with last year's "wait and see" attitude of the incoming Republican regime.

Last year, the Administration and its leadership in Congress pleaded for time to "study and review" when it was possible the buildup of a 137-wing Air Force, programmed by the Truman Administration, is asked for time to "study and review" before moving forward with airport development and other civil aviation programs.

Programs—After 1953's period of grace, a period of suspended animation for aviation, the Administration this year presented Congress concrete programs to pass on.

• The 137-wing Air Force program presented by the President in updating

the Administration's emphasis on airpower was welcomed warmly and supported by Republicans.

On last night, Democrats heralded it as their victory. They withdrew at the incoming Administration's step at closing USAF's budget by \$5 billion, suspending the 137-wing buildup and establishing an "emergency" 129-wing program, thus contained, had forced the Administration to reverse its position.

But on second night, Democrats decided they still were not satisfied with the program. They attacked it from two sides. It will be inadequate as an answer and did not put sufficient emphasis on ground troops—until to fight off "bank wars" such as Korea. The debate promises they changed no token to fit under a \$10-billion up program ending.

Sen. Stuart Symington, Exeter, Air Force Secretary, did the most effective job of challenging the Administration's program on the grounds that it was not a step in research and development and in ground troops. He said the 1955 budget was grossly understated market figure. 50% million in fiscal 1954 is \$468 million. It indicates

the USAF research and development program from \$552 million in fiscal 1954 to \$451 million.

In a series of four debates with Symington, the Administration's two top advocates—Sen. Hiram Fong and Everett Schwaner—opposed that center is not the important in looking future. As much money as could be used much for research and development and ground troops, then closed, would be used by the Administration.

Sen. Albert Gore led the alternative Democratic attack on the Administration's defense program in civil aviation and other programs for "one-way" attack. The program was, Democrats contended, a "primary" for one type of war program and did not put enough emphasis on ground troops and other programs for "one-way" attack.

But despite the Democratic verbal protests the final 1955 military budget to finance the Administration's defense program was approved by Congress exactly as recommended. Symington's announced an unreservedly agreement to boost Air Force budget by \$150 million. No Democratic attempt was made to boost funds for USAF. Symington, it is true, the Air Force budget was up for consideration was engaged in sessions on the Army-McCarthy controversy. In his absence, no Democrat picked up the ball for USAF.

• The Administration's civil aviation policy, spelled out in the Air Commerce Committee report and other recommendations by the President to Congress

Scientists warn AFA of need for new aircraft, avionics developments to offset growing Red nuclear threat.

Quaha-Awama's aircraft and its on-board instruments must put new emphasis on the problems of continental defense, particularly in the area of research and development, if the nation is to survive in the face of Russia's growing nuclear ability, two top scientists told the Air Force Aug. 14 at its eighth annual conference here last week.

"There is still much research and development required to adequately assess the gap between attack and the present level of technology and defense."

As our potential costs build, up would offshore capabilities, we must increase the autonomy between that of

Adding force to the scientific warnings, Rep. W. Stirling Cole, chairman of the Joint Congressional Committee on Atomic Energy, declared that conventional defense "measures will approach the greatest and most difficult national security problem ever faced by our country."

Principal conclusions reached by the commission was that the Reagan-Chadwick's new Continental Air Defense Command—which will integrate efforts of the Army, Navy, Air Force and National Guard (JANETRY WEEK Aug. 6, p. 15)—must have superior equipment to give complete protection.

► **Transcendental Red Strides**—Both De Koff and Quark, admitted the Russians have made tremendous strides to overcome America's advantage in nuclear weapons.

Quinlan declared that, while we "hoped the Soviets in every important post-war technological breakthrough, we must be very cautious in assessing the images of our advantage. My own appraisal is that we are in a race where our lead is more than good."

integrated system. Its effectiveness, at the present level of the technology, cannot be as high as our country must have to create it at once. The improvements will come if we maintain an adequate level of effort in the science and technology of the arm.

• The cut-acrosses raised, "we

- During World War II radio waves used to detect distant air battles were intercepted and decoded

• We must ensure the energy will continue to be a source of growth and development for the better future. "We are a country of capital to be used."

that most of the R&D be devoted to the devel-

Logistics system is set up for 15 Convair C-131Ds may be used for other fleet transports if successful

Military Air Transport Service has adopted a new logistics plan for spare parts-patterned after the commercial airlines system-for the support of 11 C-130s. The first completely "off the shelf" transport purchased by USAF.

- Only exceptions will be high-value items requiring a lead time not exceeding one year
- Initial procurement of aircraft assets

- Low initial investment
- In pipeline time for opens is reduced to a minimum
- Less storage space requirement
- Cautious of the possibility of overstocking
- Asault, as an enterprise, can obtain parts from any base used regularly by SMEs in commercial service.

When the decision was made to buy the C-130D, military designation for the Comets 140, the name also was

"In addition to meeting the threat of an atomic war," he said, "there is also the need for research and development directed toward fringe conflicts: the so-called brush-fire war."

"The events of recent years have clearly indicated that the Soviets would prefer to accomplish their ultimate aim by a process of growing-awry of the free world and we must not neglect the threat of the threat."

Baseline Supply Plan

developed partly by MATS and Carvar. It was approved by USAF Head

USAF purchased 53 C-131s (Aviation Week Aug 23, p 17) and assigned 15 to a MATS transport squadron based at Bolling AFB, Washington, D. C., for domestic service only. The

others will go to other continental Air Force commands such as Air Research and Development Command, Air Defense Command and the Tactical Air Command.

A plan to extend the new spare supply concept to a portion of the other 11

► **Airline Experience—Opportunity** In using the concept was ideal, since there is a vast amount of experience data available from commercial operators.

A MATS team analyzed space consumption data accumulated by National Airlines as the operator of NAL 390, which totaled about 11,000 lb. The team later evaluated the cause of relief

► **Sample Procedure**—The sports plan at the operating level, is simple:

The MACTS system makes its spare request to the Bolling AFB supply office. If the stock is needed together but not in Bolling stock, a triotype request is sent to Conquest and the stock is delivered.

handed to the agencies by air. The pact is charged against the "full" contracts and documents submitted to the San Antonio Air Materiel Area for payment. SAAMA has some current business

ability for Coverts himself. The report is mailed to Covert by Bolling if it is a far and, replacement. This parallels the procedure used by commercial Covert replacement.

The C-330D was the Pratt & Whitney Aircraft R2800-100W, military version of the commercial R2800 C830.

parts consumption will be maintained by the squadron and consolidated in MACTS headquarters using IBM technology. The experience data will be collected each month.

personnel, will determine if the no-logistics plan can be utilized successfully in other new transport scenarios on the MNTS East.

MAI has used the procedure of obtaining spare parts directly from the manufacturers of other transport aircraft when conditions have made it advantageous. In addition, Lt. Gen. J.

Fiscal 1994 expenditures for military and related procurement by Air Force and Navy climbed to an unexpected 19.3 billion, setting a post-World War II record.

Defense Department's original program anticipated an expenditure of \$5 billion, \$6 billion by USAF and \$2 billion by Navy. The department's new calculation shows USAF exceeding

► **Big Balances**—The upward trend in expenditures is expected to continue in fiscal 1995 as the big unexpended bal-

The unencumbered balance, US\$3.2 million at the end of 1994—is used to pay for deliveries contracted for in previous years.

This is the expenditure picture of aircraft and related programmes was the build up started in mid 1990 with the outbreak of the Kosovo war.

- Fiscal 1998: \$1.5 billion, \$1.9 billion by USAP and \$791 million by Navy.
- Fiscal 1999: \$1.6 billion, \$4.3 billion by USAP and \$1.7 billion by Navy.
- Fiscal 2000: \$1.6 billion, \$6.5 billion by USAP and \$2.5 billion by Navy.

In fiscal 1956, obligations for aircraft and airfield procurement plunged to \$2.4 billion from \$42.4 billion in fiscal 1955. There was a sharp increase in



craft Constructor's annual show at Farnborough Sept. 8-11. The swallow has also passed a three test at 1,000 ft. thrust.

Weight is only 267 lb. The new heliport measures 15.75 in. diameter, 61.75 in. long. Construction seems to be relatively simple.

ing gas obligations after de-obligations have been deducted.

The law set obligations for 1994 and due to large-scale de-obligations resulting from "bookkeeping" changes as well as contract cancellations. For example, the criteria for determining what constitutes a lease life "obligation" were tightened at the direction of the General Accounting Office.

■ Navy-Marine Department officials predict a sharp rise in obligations during fiscal 1995, following adjustments in the aircraft program by the new administration in 1994. (Aircraft Week July 26, p. 31)

Fiscal 1994 obligations by USAF totaled \$1.6 billion by Navy, \$736 million.

Unobligated funds on hand at the end of the fiscal year amounted to \$18 billion.

This sum was divided: USAF, \$4.7 billion; Navy, \$1.1 billion. Obligations over the three previous fiscal years, showing a peak in fiscal 1992, were:

- Fiscal 1991: \$60.5 billion, \$7.4 billion by USAF, \$53.1 billion by Navy
- Fiscal 1992: \$14.5 billion, \$3.6 billion by USAF, \$10.9 billion by Navy
- Fiscal 1993: \$12.4 billion, \$7.5 billion by USAF, \$4.9 billion by Navy

Aircraft Firms Again Eligible for Writeoffs

Office of Defense Mobilization last week told the aviation aircraft and electronics industries that they again qualify for first loss writeoffs and, in the same breath, unveiled a new program to cover substitution needs in case of war.

Manufacturers must prove a need

YC-130 Flight

Edwards AFB, Calif.— Lockheed Aircraft Corp.'s YC-130J transport transport made its first flight last week, taking off from Lockheed for a 50-mile loop in the Air Force Flight Test Center. First Stanley Bolt took the log 150 ft wingspan transport off the runway at 1200 noon then a third the distance ultimately required to reach its cruise.

"The immediate verification of subsonic glide design for short field operations under this highly regulated new test for the Air Force," said Lockheed's engineering vice president, John E. Hildner.

The tailscope transport is powered by two Allison T56 engines with Curtiss-Wright Turboelectric propellers.

for facilities and that they are eligible to fill defense contracts for the military services or the Marine Corps, Canada.

ODM and the agencies also must be supported by their own obligations to show that an actual shortage exists.

In a second order, designed to maximize production facilities so that no time will be lost if full production is needed in an emergency, ODM ordered Defense Department AEC and the Maritime Commission to select the plants they believe would be essential.

The three produced must meet one or more of these criteria:

- Require a long lead time or have no substitutes.
- Be currently, out of production or at

speed in stock large quantities in case of war.

- Require conversion of an industry or a number of plants.
- Require materials or processes essentially different from those now in use.
- Require production equipment that industry does not have.

The order sets up a defense facilities maintenance board under the chairmanship of ODM to recommend suitable policies and procedures that may be necessary to meet out the program.

In addition to current contracts, the order sets plants will be maintained in standby status where necessary. Government-owned tools will continue to be stored at or near plants where they will be used.

New Oerlikon Missile To Start Tests Soon

Oerlikon Tool & Arm Corp. of America says its production order for four Sea-Scud-target guided missile has been given, pending tests of a new version in the near future.

Twenty-five missiles manufactured abroad by parent company, Oerlikon Maschinen Tool Works of Zurich, have been evaluated at Holloman AFB, Alamogordo, N.M.

The Oerlikon missile is 14 ft long, 3 1/2 in. in diameter and has a wing span of 4 ft 7 in. Weight is given as 545 lb. Economically guided, the missile can reach 552 mph and are designed for ground-to-air use.

A spokesman for the American company, with headquarters in Adelaide, says Oerlikon has received USAF that the weapon will be sold exclusively to Westinghouse.



New Cessna Light Copter Undergoes CAA Tests

Cessna's new C440 all-metal copter is now being flown at its Civil Aircraft Certification Office in

Portland to be completed shortly. Weighing 3,000 lb gross, it has a 51-ft diameter, two blade main rotor and a two-blade tail rotor.

The 260 hp Continental is mounted ahead of the cockpit. There is space behind the pilot and cockpit for cargo.

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Hydro-Aire Tests For Future

Can today's test facilities cope with the more stringent requirements of tomorrow? That's the question that Research Engineers at Hydro-Aire are constantly here to ask themselves—and answer. For so many current and future designs go "Higher, Further and Faster" the requirements for necessary design must keep pace with the speed, strength and laboratory equipment that undergo constant improvement to handle the new requirements.

■ Better Air—Hot air needed to test turbines and jet engines, for example, must be supplied at ever increasing temperature ranges. A year ago 300 degrees F was considered adequate. Today, Hydro-Aire's huge boiler and compressor facilities supply hot air at more than 1000 degrees F and at much higher pressures. They are required to test present equipment.

■ Future Air—In one of the largest "cold bores" of its kind, Hydro-Aire tests air heated up to over 180 degrees F and over a 1000 mile per hour flow rate, with the results of the testing for condition. Among the new equipment added to the laboratory, a large analog computer an electronic "brain" to aid in future research.

"Today," states H. H. Brundage, President of the Company, "Hydro-Aire's Engineering and Research Laboratory is one of the best-equipped in the world. It requires constant change and improvement, to keep it that way."

FACT

New Gilfillan GCA Quadradar
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cost, best-proven, lightweight radar traffic
control system available today!

PROOF

**Check these exclusive
and vital advantages:**

- ☐ Only the Gilfillan GCA Quadradar provides all four important airport traffic control functions—search, identify, track, approach, height-finding and alert—into a single, lightweight one-piece equipment.
- ☐ All the Gilfillan GCA Quadradar advantages are already built in and proven. The price will not increase because of need for new designs, designs for "filling-in" or for need for further pricing. And the new equipment costs less than other lightweight one-function radars!
- ☐ All controls, both electrical and mechanical, are in- or out-of-sight by operator console. At the time of a switch, the operator selects any of four radar displays within five seconds!
- ☐ Instant multiple runway coverage at the base of a sector. Both automatic and manually controlled "360". No need to go out to the field to re-align the entire equipment. Realigns in less than five minutes!
- ☐ Operation on 50 or 60 cycle power. Sets up ready to operate within 5 hours.
- ☐ 50 mile range on final approach. Operator can switch in seconds to 10 mile display as aircraft enters.
- ☐ Lesser or high-priority range marks and either fast or slow scan. Operator can switch instantly, to instantaneous sweep and fast scan, for greater precision during final critical approach miles.

- ☐ Overlaid terrain display, not at airport but display can be off-center instantly, giving maximum range in any desired direction.
- ☐ Provides instant sight of coverage with 36° in azimuth and 30° in elevation. Operator can also select either 22° or 11° elevation coverage.
- ☐ Circular indicator, eliminating rise or move center. It is already included in base equipment.
- ☐ Completely flexible: operate without modification in a truck on the field or in a building.

**PROVEN PERFORMANCE
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Only the Gilfillan GCA Quadradar can bring the known reliability of components already proven under most adverse conditions in world-wide service. Back by the company with by far the greatest experience—builders of 580 GCA equipments.

Maintenance and training do not present new problems. Components are interchangeable with current GCA equipments now in operation in 26 countries around the world. Experienced GCA operators and maintenance personnel need only a few minutes further instruction.

Only Gilfillan provides field service through 300 Gilfillan technical experts located throughout the world.

Only Gilfillan offers a firm, low price on a superior, state-of-the-art, in production, complete 4-way radar, money-back 90-day delivery date (10 month delivery date at order), backed by Gilfillan's unparalleled record of on-time delivery.



Mid-Air Crash

- F-80C, F-94C collision shows rugged strength.
- Both fighters land safely despite severe damage.

Regardless of U.S. jet fighters, built to take severe loads in high-speed maneuvers, was demonstrated dramatically when a USAF Lockheed F-80C and a F-94C collided in mid-air recently. The crash resulted in severe damage to the planes—but both landed safely.

The planes, shown in an aerial view of how the Lockheed F-94C had After the Starter landed, the pilot and that had been the damage sustained by its plane, he would have crashed out and walked home.

Lockheed Report—This is a variation account as reported by Lockheed Aircraft Corp.'s representative.

"On 4-15-54 at approximately 1015 hours (4:45 p.m.) F-94C aircraft, serial number 51-578, was flying at an approximate 20,000-foot altitude when, about pilot crashed in an explosion occurred. At the same time, F-80C aircraft, serial number 49-185A, was also flying in the same area (approximately 15 miles south of McClellan Air Force Base) at an estimated 10,000-foot altitude, when he made a bank to the right and found himself looking up the wing of the F-94C and appearing deadly.

"The pilot of the F-80C immediately took evasive action by lowering the nose of his aircraft and heading for the deck. However, he was unable to avoid striking the F-94C. Major damage was sustained by both aircraft.

"The F-80 returned to McClellan Air Force Base with approximately five feet of the left hand wing tip gone (from approximately wing station 160) to wing station 234), including the centerline mounted tip tank. The outboard wing fuel cell had been torn from its attachment and all aircraft control was jammed. A safe landing was made, however, in spite of these obstacles.

"The F-94C pilot, never having seen the F-80, assumed he had had an explosion in the aft section and returned to Hamilton Air Force Base, where a safe landing was made. The damage sustained by the F-94C is evident. The aft fuselage and drag chine were lost. The radio was rendered inoperative, and the aft drag chine was lost.

74-Degree Angle—"As nearly as the accident can be reconstructed, the two aircraft were approaching at an angle of approximately 75 to 80 degrees when the F-80 struck a bank to the right. As the right wing dropped, the F-94C became visible to the F-80 and the pilot



LOCKHEED F-80C in landing is viewed all right up to periscope rather wheel.



CLOSEUP shows how close USAF fighters came to being cut in two in the collision.

immediately executed evasive action.

He was unable to completely miss the F-94C, however, and struck that aircraft with his left hand tip tank at approximately fuselage station 277 (left hand) pressure close through the aft fuselage of the F-94C, taking virtually all of that section including the aft fuselage and the drag chine and in the process lost the tip tank and approximately five

feet of the F-94C's left hand wing tip.

It might be interesting to note, however, that the pilot said the F-94C aircraft caused very much of the tail pipe was gone. He also mentioned that had he been able to see the damage sustained to his aircraft, he would have got out and walked home.



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Subena Copter Clips Regular Route Time

(McGraw-Hill World News)

Brussels-British European Airways tonight will balance a Saturday Subena helicopter flight that clipped three quarters of an hour off scheduled Brussels-London time, by taking a new tack at the copter's sole en route to Europe.

The Belgian Subena's Sikorski S-55 flew past London's Big Ben and landed on the north bank of the Thames River two hr. 55 min. after it took off from Brussels, cutting 44 min. off leading transport time.

Subena operators manager Andre Vanacker, who piloted the flight, said that larger helicopters of the future would do Brussels-London in 75 min.

Early Superbee—Shortly after the Vanacker flight, BEA chairman Lord Douglas of Kintyre arrived here for talks with Subena chairman Gilbert Peers and a brief inspection of the Belgian airline's international copter system. With him were John D. P. James, parliamentary secretary to Britain's Minister of Civil Aviation, and Sir George Colville, permanent secretary of the Ministry.

This, noted the simplicity and ease of operation of the small city center

helicopters, run as express jobs. These installations do not have as traffic control, considered unnecessary for Subena's fleet of four S-55s. Nor do they have the lighting crews on standby.

The British delegation also began to appreciate Subena's conception of the copter as an airborne bus. BEA's experienced helicopter passenger service, in operation for the past two years, has treated rotary-wing craft as miniature airlines.

► **Copter Safety**—The British departed with the Belgians on safe helicopter operations. BEA is more concerned than Subena with the same as when a copter might crash.

British European's chairman also indicated he believed there is a chance that a rotor blade will break off shortly after taking off or landing at a heliport as a suggested aim.

Another BEA-Subena difference was on the limit of future copter schedules. Subena suggests helicopters as the replacement for fixed-wing transports over European routes within the next few years. But BEA believes the rotor blade never will be much more than 150 mi.

Thousand-mile flights, such as London Rome, always will be quicker and easier by regular airlines, Lord Doug said.

► **Copter Names**—But the British group and Subena officials agreed on the outstanding problem of helicopter noise, a

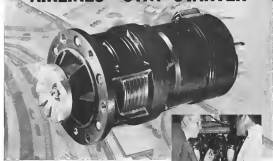


Copter Moves Owa Mongor

is a Sikorski S-55 helicopter at Owa Mongor, a modern house for 2,000 sq ft. longer is fitted by Sikorski HES helicopter to close structure's lightness. Made of magnesium aluminum bond together with 150 bolts, the frame weighs about 1,200 lb. and will be

covered by vinyl-coated glass cloth weighing 150 lb. Maximum use the new house is lighter and cheaper than tents, can be erected at speeds up to 40 mph, assembled. Navy's Sikorski has ordered it design for a similar 114-ft. airplane hangar.

AIRLINES' "OWN" STARTER



OVERHAULING AIRCRAFT STARTER, JULY 1970, CAPTION: J&H STARTER

J&H.... airline engineers and maintenance men combine skills to improve commercial starters

Today, after over a year of highly successful operation, the J&H Commercial Starter is referred to as "our own" by many of the world's leading airlines. And well it might be, as recommendations of airline personnel were combined with our experience to make 10 outstanding improvements to the already famous J&H Starter.

With components strengthened, greater built-in resistance to vibration, wear and corrosion, the J&H Commercial Starter extends service life by many hours, requires the minimum in maintenance. And to each airline's advantage, the newly improved J&H does not duplicate older J&H models in current service. All J&H parts, except the key-to-place sleeve bearings, are interchangeable with their counterparts in previous J&H Starters.

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Jack & Heintz, engine unit over J&H Starter installation with a Conquest 300 motor.



Goodman Services, J&H starter engine drive on of J&H Starter on new Super Constellation.



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Rotomotive

AIRCRAFT EQUIPMENT

barrier to operations both land and in London.

In French, none was one of the reasons the city council ordered Belgium not to use the roof of its new terminal building in an airport. The action was forced to choose a site close to its own airport buildings and therefore far from the Belgian district.

Production and its stock of components from Belgium and other sources every time a helicopter lands

• **BEA** Expansion—Lord Douglas would not indicate how much he planned to expand BEA's operations in Europe/Canada and South America. Airport action in the near future.

United transport company are available for commercial service, British European probably will have to operate each aircraft at a loss. And, unlike Sabena, BEA will have no gas to offset this deficit.

The Belgian airline estimates its capital loss at \$300 for each 1,500 passengers mile flown in the average day, but tries to make this up by using every available \$55 for charter flights.

SEC Lists Aviation Stock Transactions

Paul Moore, director of Republic Aviation Corp., sold 30,000 common shares in the company last June, as reported in Section 4 of Exchange Commission's survey of stock transactions for that month.

The deposit received by Moore's holdings is \$177,220 common shares.

Other transactions reported in the survey:

Air Associates Inc.—Generalist of 300 shares, sold by J. H. Smith, holding of 1,000 shares.

Air Transport Co.—Acquisition of 100 common shares by Charles de Gaulle, director, holding of 1,000 shares.

Air Transport Co.—Acquisition of 100 common shares by Douglas, director, holding of 1,000 shares.

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... (text continues with more stock transactions) ...



LARGE WINDOWS—One on each side, in place of front two-door bridge on new 234 mph Super 18 per improved view, economy, more comfortable cabin.

Beech Starts Super 18 Deliveries

... (text continues with details about Beech Super 18 deliveries) ...



UNBUSHED NDR leaves only equipment available for covering top panel. Engines assemblies are also heavy. Beech has 54 million plus Super 18 backlog.



DOORSTEP installation provides a large entrance area for baggage.

Edo means more than PRECISION WORKMANSHIP

EDO Means Design, Too. Where plans are drawn. Where tools through any structure are precisely built. That's why making airplane plans for 27 years has made precision workmanship of airplane components a specialty at EDO.

Because of this unusual men-working know-how, many manufacturers are turning their heads to make parts and sub-assemblies problems easy to EDO.

What's more, EDO's men engineering skill, which has designed everything from airplane parts to the Navy's latest engine equipment, can make problems right from the design stage, if desired.

Perhaps EDO can help you.



A NEW EXAMPLE OF EDO CRAFTSMANSHIP



Kerosene EDO engine block.



EDO 400 cc. engine block.



Precision roller bearing.



Edo's roller bearing.

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DOORSTEP installation provides a large entrance area for baggage.

AA Declares Dividend

... (text continues with details about AA dividend) ...



AVRO GETHSA has more firing with steel-gray flames (left) and intake across midline. Engine (right) has firing around.

Avro Canada Pushes Jet Developments

By Irving Stone

MILTON, Ont.—Engineers of the Canadian jet engine industry in A. V. Roe Canada Ltd.'s Gas Turbine Division. The division has created an engine and engineering and manufacturing road work on Canada turbojet, present production engine powering the Avro CF-100 and scheduled for the Canadian-built Sabre Mk. 6.

Avro promises still greater achievements with a new experimental engine targeted for 15,000 to 20,000 lb thrust, and scheduled to run the water (Aviation Week, June 14, p. 11).

► **Max Thrust, Low Weight**—A notable design and production improvement Avro has worked into the Canada is a two-stage turbine for the most recent models of the Avro—the 11 and 14. The pump from a single to a twin turbine, with a considerable boost in thrust, has been accompanied with no increase in length over the base Canada configuration.

More important, it was done with a weight slash that topped 140-150 lb from the engine. Key to this accomplishment is the use of steel metal components instead of castings, where possible, in the aft portion of the engine.

► **Hot-Fire Mileage**—Revised at the center bearing, the design is completely new. To accommodate the second-stage wheel, the backdoor cutting and sub shafts were shortened and a lot of the intake was stolen. The turbine nozzle remains of investment cast blades with forged shafts being into steel metal shrouds on the inner and outer ends.

Once and it supported by a modified flange rear portion by steel

metal flange. The entire assembly is joined by the Northern process. There are 14 axial segments of five blades for each stage.

► **Engine Details**—The Canada 11 is giving some trouble. CF-100 Mk. 4. Delivery of this engine across was started in April and site buildup has been in line with aircraft requirements. Weight of the engine is about 1,425 lb, maximum guaranteed thrust about 7,000 lb, takeoff temperature about 2950°.

The Canada 14 is targeted for the Canadian-built Sabre Mk. 6. Delivery of the engine to meet the Sabre program is scheduled for September. Weight of the engine is about 1,425 lb, maximum guaranteed thrust is 7,275 lb, but about 7,400 lb is expected takeoff temperature about 3150°.

A further stepdown still is required for the Canada 14, the engine dimensions and weight target is a thrust of about 5,000 lb. Changes are contemplated include an increase of present mass flow (114 lb/sec) by changing out stages of the compressor. The 5,000-lb-thrust engine may be available by the end of 1957.

Cost of producing the Canada is approximately 30 per lb of thrust.

► **Three Activities**—Avro's Gas Turbine division is split into two main facilities—the production section (plant 1), and engineering and experimental assembly (plant 2).

Assembly facility is the Curve-shaped Model Test Laboratories about 70 mi north of Milton, near Perry Sound. This is Avro's plant 3, operated by its engineering department and capable of full-scale engine testing.

► **Production Facility**—The engine production facility at Avro is one of the most modern anywhere. It covers 740,000 sq ft. Originally Crown-owned, the plant was purchased by Avro-McDonnell and is government-owned.

Within 16 months after its official opening Sept. 29, 1955, the facility had reached its production objective, a rate of 100 engines per month, well below peak capacity. Under its present program, this rate is to be continued until October 1959, when it should drop to 65 units per month. Current orders are out in the spring of 1956.

Purpose of establishing the Avro engine production facility was to set up in Canada as almost completely independent these engine plant together with its sources of supply. The loss of important supplies brought into the Avro production plant include:

• **Engineers**—Production divisions of General Motors, Canada, supplying machine tooling and brackets to Avro. Initially, the jobs were increased, equipment purchased and tools manufactured by Avro, then transferred to Frigidaire



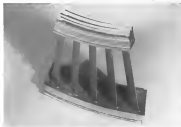
STATION BLADE 2143 not clear cut in 1-1/2 inch while bearing machine.



COMPRESSOR DISK is Lufkin vertical brooch for cutting blade root slots.



BLADE ROOT SLOTS also are cut in Canada compressor disk in Detroit branch.



NOZZLE SEGMENT for two-stage turbine. Blades are heated to short shrouds.



INTAKE CASTING set for operation on Avro's metal drilling machine.



COMPRESSOR CASING has inside surface machined on vertical turret lathe.

its actual production, because "we're short of space as a result of some job overloading."

• **Canadian Steel Improvement Ltd.**, supplying rough, forged steel blades and brackets and finished forged aluminum blades to Progress for various welding jobs. The CSI facility is 60,000 sq. ft. plant, not built specially for GEDA production. This part plant, CSI was purchased by the British Hawker Siddeley Group, of which Aero Canada is a member adding substantially to HIR's heavy work in expanding Canadian efforts.

Initiation is to expand this CSI facility. It is slated to develop and supply Avco with titanium alloy forgings for future engines—probably, probably for Avco's new 18,000-20,000-lb thrust jet scheduled to power the company's March 2 delta interceptor.

• **East-Rates Ltd.**, a division of Joseph Laro Co. Ltd., Ragned initially set up to supply fuel system components for the GEMA engine. Avco reports.

• **Light Alloys Ltd.**, a division of Dominion Magnesium Ltd., is producing the entire casing, compressor casing, engine casing, ballast, bearing housing and gearbox casings for the engine. Also supplying parts for the CF-104 engines. The company does about 95% of its work for Avco.

• **York-Green Ltd.**, a division of Canadian Aero Sales & Gear Co. York was established to produce all gearbox for the GEMA engine.

• **MacDonald-Bass Aircraft Ltd.** About one-fifth of this company's production was devoted to the main fuselage of business and transport for Avco.

• **Cockburn Aircraft Ltd.** Committed to do various short spiral jobs, this activity has not combined cases and these roles for the GEMA. A large percentage of those completed in this work were considered critical at the start of operations. Avco engineers are, adding that this condition directly was caused by other subcontractors and Avco itself.

• **Work Remains**—Avco machines all the engine casings and bearings, spare parts, shafting and hot end details made from forgings. Blade and bracket work at Progress is scheduled to start in Avco this winter, as assembly starts to lower the cost of the engine. Avco production was very important in the learning curve now permits this work to be brought back into the shop.

2. Suppliers. The firms Avco work some of its equipment require. These companies include Borden Aircraft Corp., Bend's Scientific Magnetics division, Jack & Henrich, Inc., W. H. Nichols Co., Alkermid Nig Co., Martin-Rodwell Corp. and W. J. Doe Tool Co.



BACKGATE CASTING for GEMA is expected in special job.

• **Engineering, Experimental**—Avco's engineering and experimental activities being supervised occupies about 775,000 sq. ft. in Plant 1. Some 80% of the equipment in the facility is owned by Avco.

The engineering section is staffed by about 130 engineers and technically trained personnel. Other personnel, including draughtsmen and clerks, total the figure to about 850.

Experimental manufacturing activities responsible to the engineering section—has about 775 engaged in the various trades.

The overall engineering and experimental manufacturing department is responsible for:

- Origination of basic (assembly) data for design.
- Initiation of work on development contracts from the Department of Defense Production on behalf of the Royal Canadian Air Force. The activity also includes work required to support production of these developmental contracts.
- Handles initial work on changes dictated by service requirements, production difficulties or improvement in design. Example: The change from single to two-stage turbine in the GEMA. The design change was initiated in November 1952; the design was complete by the middle of February 1953; the first engine was available in May 1953. Model test was completed successfully in February 1954.

• **Study, Prototype Work**—Experimental manufacturing department has an investigation group which studies methods of manufacturing for a new design and carries the experience over to the production activity to see that it is implemented properly.

The department also does prototype manufacturing, as well, against production order numbers on quantities up to 25 sets of parts. This helps the engineer have ideas while it tracks its making process the experimental manufacturing department to retain its shop floor. The department on occasions might take on some overflow work for the production activity.

• **Job Facilities**—Shops operated by the experimental manufacturing activity in these a small facility for aluminum and castings is capable up to about 25 lb. finished, vacuum castings and small steel forgings for castings weighing up to 4-5 lb. Associated with the facility operation is a pattern shop.

There is a fairly large machine shop equipped with typical machine tools. A sheet metal shop produces a few proportion of the combustion case and other hot end parts on experimental orders.

• **Laboratories**—In addition, there are laboratories for fuel and control systems, mechanical components and instruments, and a small weldment.

At the Nickel Test Laboratories, Avco has about 160 people in work, a design construction research. Right now, the work for the GEMA was 50 in at 23,000 ft. Advent of H-4 had brought the altitude down to 18,000 ft., but Avco researchers brought the figure back to 24,000 ft. through improvements in cross-lighting tubes and in other details.

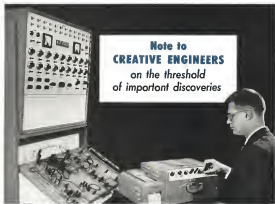
Further research at Nickel has given right ability with the GEMA. It is about 24,000 ft. and is reported. Another Avco achievement is the design of an auxiliary chamber within the diameter limits of the compressor inlet, for efficient combustion.

Quantity Output for Solid Rocket Charges

Solid propellant rocket charges for the Nike and Honest John missiles and Nike missiles are now being produced in quantity by the Hercules Powder Co., Waco, Michigan, Del.

An Avco Defense Corps contract with Hercules has been increased by \$120 million and extended for 15 to 18 months, covering the production of the charges for the three missile systems, plus other charges for rocket and cannon propellants. The work is being done at two Ontario plants being operated by Hercules, Radford Arsenal, Radford, Va., and Souderton Ordnance Works, Lawrence, Kan.

Hercules is making the solid propellant charges in the Nike boosters, the main charge for Honest John, and what the company is now improving all-wheel model of the Air Force's Rho unit.



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IN STOWED POSITION, reverse jets about 27% thrust loss



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NACA Unit Gives 50% Thrust Reverse



FORWARD VIEW of F-14 test installation shows jets in thrustreverse position.



REAR VIEW shows how tailpipe cut along when thrust is being reversed.

Cleveland—Thrust reversal for shortening the landing roll of jet-powered aircraft is being studied extensively here at the National Advisory Committee for Aeronautics' Lewis Flight Propulsion Laboratory.

After a few months of ground floor effort, NACA researchers have come up with a preliminary experimental model of a reversal, which was demonstrated at the organization's recent 1974 symposium at Lewis.

How It Works—The reversal is a split cascade type offering about 50% thrust reversal—a relatively high value—for about a 27% loss of thrust when not in use.

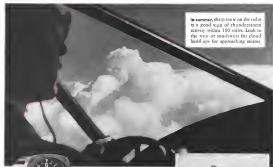
For experimental purposes, it has been installed on an F-14 jet fighter and also is going on a jet pod installation under the wing of one of NACA's Fairchild C-119s used for research, it is reported.

The configuration involves a double set of nested inward blades stowed in the engine tailpipe. For thrust reversal, the tailpipe section splits into two cylindrical air portions, each bringing one set of blades into cascade squarely across the tailpipe flow, so turning the exhaust gas forward past the open tail pipe nozzles. In this way, no auxiliary device is required to make the flow reverse the cascade.

Feasible, Weight—Although refinements of the configuration could offer perhaps once 10% more thrust reversal, changeable against the design is the intense storage with its consequent loss

FLY WEATHER-WISE

[These weather items prepared in consultation with the United States Weather Bureau]



In summer, sharp sun on the tail is a good sign of thunderstorm activity within 100 miles. Look to the west or southwest for cloud build-ups for approaching storms.



Keep your wristwatch set to the latest official time, reported from stations along your coast. Otherwise, it will indicate higher than true height when flying in lower pressure.

RIGHT: COURTESY OF NAVAIR

Early morning stratus clouds will generally dissipate by mid-morning if no other cloud layers are above.



In otherwise fine weather, it may be impossible to measure VFR limits, because all have got above the base level of 1,000 ft. However, first line low visibility figures are poorer visibility when headed into sun.

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of thrust. This means storage also would limit the aircraft's application to non-offensive engines.

Weight of the design is another consideration—at this stage of very preliminary development, the configuration subcommittee's weight figure of about 210 lb. is reported. It must be noted that NACA's preliminary research efforts have not explored weight reduction. Undoubtedly, the weight could be pared.

► **Compassion**—Like most other development efforts related to conversion, the ultimate solution to reverse propulsion will involve compassion. That, with respect to bombers where low range is important, a low thrust loss from storage is a prime consideration.

A reasonable thrust reversal—about 10% on a dry runway, 20% on a wet runway might be realistic.

On a transport, where safety is a key factor, high thrust reversal would be

desired, obtained perhaps at the expense of some thrust loss in flight. As air transports of course, would be tagged to accommodate both high thrust reversal and very low thrust loss in flight—the ultimate test of thrust-reverser designs.

► **Target Type**—NACA's members also are working on a target type of reverser which promises relatively high thrust reversal values. This type already has undergone considerable development. Various configurations have been revealed by Racing Airplane Co. (Aviation Week Apr. 19, p. 28).

Tests of these configurations showed that about 30-40% reversal of the jet blast is possible with units that could reasonably fit into the space available near the engine tailpipe. One of the most promising—a classified unit—highlights features of mechanical simplicity, reasonable weight and simple external movement (control) designed so that there is no interference with exhaust flow during flight.

Estimates are that a freight-type installation would not exceed 200 lb., with development and operating expenses probably bringing that figure even lower.

► **Anaconda Cascade**—Another type of thrust reverser employs a series of ramps behind the engine tailpipe to form an anaconda cascade (Aviation Week June 14, p. 38). This configuration is a development of Success, France's air-bombardment engine fanjet. The design is available in three types—retractable, detachable and fixed.

To force the gas through the anaconda cascade, a jet of air is piped up steam through the middle of the anaconda device. The greater the force of the air blast, the greater will be the amount of exhaust gas diverted into the cascade for increased thrust reversal. Because the blast remains in the jet stream while the reverser is set in use, the forward thrust of the engine is unimpaired.

With this anaconda cascade type, about 20% thrust reversal is available; thrust loss with the retractable type is about 2%, with the detachable and fixed types about 4%. Retractable unit requires additional engine weight expenditure to about 5 to 6% for the fixed and detachable units it is about 3 to 4% more.

► **Swirl Vortex**—In another form of the cascade type, the exhaust jet is made to swirl by a set of vanes in the tailpipe. Helical air in the angular setting of the vortex directs more of the gas through the cascade, increasing the reverse thrust.

Since the swirl vortex stream in the jet stream during normal operation of the engine, the thrust is reduced somewhat.

—15

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Jet Wings Roll Before They Fly

These B-47 wings (top) and the subsonic wings and tail fin for the B-52 (bottom) make long trips by rail before arriving at Boeing Airplane Co.'s Wichita and Inglewood plants, respectively, from the bomber builder's other contractors. The B-47's wings and fin measure about 45 ft. long and 17 1/2 ft. high, but weigh only about 12,000 lb., making the structures vulnerable to the wind. They special fixtures attached to the railroad cars

and to the member are used to reduce shock. The B-52's wings are also covered with large Goodrich Chemical Co. Green vinyl plastic liners (seen) to protect the steel from smoke, grease, rust and abrasion during their journey. Approximately 2,800 sq. ft. of fabric is needed to cover each B-52 wing wing. Before shipment the doors often require special planning and special routes to avoid low bridges.

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of introduction and cockpit instrumentation covered by Collier's, the New York Times and other American publications can only have meant, and to no little degree, by underscoring its powerful sense in the eyes of scores of millions of people who sincerely believe that space travel will give man new knowledge, forces and personalities for his constructive labor on earth.

I think there is no doubt that if the thousands of different countries cooperate with each another, regardless of political issues, if they only work together to solve the measuring problems of interplanetary travel for peaceful purposes, it is destined in the Charter of the International Astronautical Federation, then we shall be able within the next five, or 10 years, to talk in practical terms about sending a guided missile to the moon for the benefit of international science.

New Aluminum Alloy Designations Set

A new wrought aluminum alloy designation system has been developed and approved by The Aluminum Association. The change is effective Dec. 1.

The system will use four-digit numbers. Thus, aluminum alloys grouped in major alloying elements are:

- Copper 2xxx
- Magnesium 3xxx
- Silicon 4xxx
- Nickel 5xxx
- Manganese 6xxx
- Zinc 7xxx
- Other elements 8xxx
- Unalloyed series (general) 9xxx

In all three groups, the last two digits have no special significance except to identify the different alloys in the group. Generally, they are the same in those formerly used to designate the alloy. Thus, 245 becomes 2024. For new alloys, the last two digits will be assigned sequentially beginning with 01.

Second digit in the 2000-series series replaces a modification of the alloy and replaces the letters commonly used for the groups at the past. Thus, 775 becomes 7075, 8175 becomes 8177.

Temper designations in effect since 1947 are being continued without change and, as in the past, will follow the alloy designation.

Experimental alloys will continue to carry a prefix X which will be dropped when the alloy becomes standard.

The 1xxx series, designating minimum aluminum content of 99.00% and higher, differs from the other series. Last two digits indicate the decimal portion above the minimum. 995. Second digit designates any modification in the capacity limits. Thus, 1070 indicates 99.90% minimum aluminum without special control of individual impurities. 1130, 1238, etc., indicate the same purity, with special control of one or more impurities.



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Special assistant to the Secretary of the Air Force, Tom Gardner (left) took a high Mach number missile nose for a test run in the Engine Test Facility at USAF's Arnold Engineering Development Center during a recent inspection of the installation. Eugene Tost is the first of the major technicians to begin operations at the Vandenberg Test Facility. With Gardner are Ray Gray & R. Aron, AEDC assistant chief (right) and Clifford W. Newson, chief of the Engine Test Facility.

OVERSEAS SPOTLIGHT

Friendship Costs More

Estimated price of F4U F-77. Proceeding prototype last year up to \$492,000 from previous quotation of \$391,000, according to the French response. Flight (the rise is said to be due to higher labor costs and accuracy prices). Unlike long fuel systems has been used a little more than 1,000 gal. a 140-gal. engine.

Two Proceeding prototypes are under construction at Fokker's Amsterdam works.

Avanca Tries R2000s

Avanca, Colombia's largest airline, is making a test installation of R2000 engines on two of its DC-7s. If the flight check-out is successful, Avanca plans to convert its entire fleet of more than two dozen DC-7s to test in its C-46s. Cost of the conversion is estimated by Avanca at about \$50,000 a piece, including changes such as fuel in feeders in the door.

The more powerful engines will give Avanca a lift capacity payload of the 5,700-lb high airport at Bogota, and raise the DC-7's ceiling and cruising speed, company officials say.

Avons Pile up Hours


As English Electric RAF Canberra has crossed 150,000 hr—more than half the distance to the moon—in a 300-hr, seven-day-a-week endurance test designed to test its Rolls-Royce Avon engines.

After 100 hr, RAF's report on the engine was "No troubles encountered and no improvements required," so the test was extended for another 100 hr. The plane, a P.R.7, flew at an altitude of the Canberra, was flown by pilots above 48,000 ft and in all kinds of weather.

Canadian Copter Meeting


Canadian helicopter operators and government officials met last week in Ottawa to discuss modification of existing regulations that have hampered helicopter development, the Canadian Air Industries and Transport Association reports. Regulations originally were written for fixed-wing aircraft in mind and take no account of the helicopter's unique living characteristics.

The board of directors of AITA has recommended several changes in regulations and is working on an amendment to the Department of Transport



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After 10 Years New Targets Set for Instrument Progress as...

Jets Demand Lower Landing Minimums

• Missed approaches and "go-arounds" could spell liner to commercial jet-liner operators.

By George B. Lathford and Joseph Lyman

A decade ago we could lead an aircraft under most of the visibility conditions accompanying a 500 ft. ceiling. Today, after incursions into the aircraft instrument landing problem, we can lead an aircraft with a 200 ft. ceiling. Will it take another decade or longer, to go the rest of the way?

Percent-dry instrument-approach aircraft are getting by with the 200 ft. landing minimum, at least from an economic standpoint. But the Comet, the Boeing 707 and other jetliners are almost in service with us. Can they be operated efficiently with a 200 ft. minimum?

The full recovery of a piston aircraft enables it to take a missed approach "go-around" in its stride, but the jet aircraft is economically connected to land once it is below 10,000 ft. The instrument approach and landing is conducted at low altitudes where fuel consumption for the jet aircraft is high. A missed low-visibility instrument approach means by any one of several factors, requires increased fuel reserves for a second approach, at the expense of payload.

The probability of a missed approach with a jet transport is higher and consequently the need to guarantee a landing is going to become a first consideration.

• **For Example—A few figures will illustrate this point:** Assume a low-visibility (200-500 ft.) condition near the instrument-approach minimums, and approach averaging 1 minute apart. Assume also sufficient traffic to arrest status (including a missed-approach aircraft) in the traffic pattern, requiring 15 minutes to place it in the same approach position again.

The fuel consumed by a Comet 1 in such a missed approach operation at about 2,100 ft. (Aviation Week May 16, 1955), is 155 ft. less than the 312 ft. required by a DC-6. The comparison between the jet and the piston aircraft will be even more unfavorable in the



LANDING CEILING has come down to 200 ft., still not good enough for jets

future when larger jets like the Boeing 707 and the Comet 3 become available.

• **Implication:** Regrettably—Realizing the implications of this impending situation, the Air Navigation Development Board has devoted much of its limited budget to basic research necessary to provide means to guarantee a safe landing at a perfect destination. The Navy and the Air Force also have championed the objective of all-weather landings for aircraft, even at sea coasts.

It has taken nearly a decade to bring our fully the difficulties of the landing problem, many solutions have been tried and found wanting. However, the scope of the problem has become clear and we now stand at 10 years ago we were underestimating the difficulty of the solution by at least one order of magnitude. The jet transport, particularly the U.S. entries, will focus attention on this problem. In order to avoid the disturbance that will arise when the jet instrument becomes operational, a realistic review of current status and future trends is necessary.

• **The Problem—Unfolding:** The

landing problem is still a major product of the last decade of effort. Here is what we learned:

• **More than a radio system.** To land an aircraft requires not just a radio system, but the amalgamation of many factors, including pilot psychology, traffic control, meteorology, and visual aids.

• **Coupling method important.** The method of coupling the aircraft to the landing system is very important. If it is automatic, too big is involved, however, other problems appear, such as reliability, human non-landing, and lack of human straightness. If the coupling is semi-automatic (computer to human pilot), we retain the human judgment and oversight, but lengthen the time lag in the coupling loop. We also recognize such problems in aircraft accidents, errors in the computer output, and slow responses due to human reaction.

• **Visual aids needed.** Although radio aids eventually made the aircraft all the way down to a landing, the pilot will, nevertheless, constantly need visual references. Visual aids also can greatly assist the pilot during the few seconds

About the Authors

This article is based on a paper, "A Critical Look at the Last Decade of Instrument Landing Progress," by Joseph Lyman and George Lathford. Lyman and Lathford have more than 30 years of collective experience in their "critical look."

After 15 and 30 years respectively with Sperry Gyroscope Co., where they had been engaged in research and development on instrument landing, navigation, and traffic control problems, Lyman and Lathford joined Airborne Instruments Lab in 1941 to lead its navigation section. Each holds 11 patents in the field and has more than half a dozen where pending. Both were members of the Federal Flight Committee of the Professional Civil Aviation Organization, predecessor to KAO.

Lathford served on the Research & Development Board's subpanels on aircraft navigation and air traffic control. Lyman, who recently left AIL, to join his own business, is a Naval flyer and holds the rank of lieutenant colonel in the Marine Corps Reserve.

prior to touchdowns by providing nearly instant measurement.

• **Landing can be bottleneck.** To advance from the ability to land one aircraft under instrument conditions to the capability of landing a continuous stream of aircraft presents the problem of aircraft separation and traffic control during the instrument landing, approach, landing, and taxing phases. The part of any air traffic control system is to guide the traffic to its destination expeditiously and safely. The landing phase is the single most output element of the entire system. It must be efficient, safe, and used to its maximum capacity if the rest of the air traffic control system is to work at all.

• **Problem grows.** While attempting to build a landing system for speeds like the DC-5, such lengths of the jet age as the Comet, the B-47, and the 707, have caught up with us. The aircraft solutions, inadequate even for the DC-5, are even more inadequate for jet aircraft. The "committal is lost" at some point near the end of an approach is the more significant concept for jet aircraft than it was with the DC-3. Then, the landing problem we have set out to solve has not remained static, but continuously increases in magnitude. Even before a solution has been attained, the problem has become more complex.

• **More data needed.** We have learned that we are uncertain about measuring existing and existing. We are not even certain as to the exact profits in space aircraft dollars. Briefly, we must measure the measurement of an aircraft and crew under landing conditions more

exactly before we can be certain of some of the variables in the operation, and perhaps that have contributed most of the errors on present today.

• **The Landing System—Staring with the landing system itself, we have learned that the beam is not precisely straight in the vertical and azimuth planes. They have distortions due to refraction in the vertical plane from the earth and from objects such as hangars and trees in the horizontal plane. Because both of these sources of refraction are essential to an airport, we must learn to live with them, possibly devising radio systems that will measure it electronic three dimensions.**

Recent USAF, CAA, and ANSB

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efforts to narrow the leaderless issue have been encouraging. Other efforts along the line during the last decade include instrument landing systems at 100 mph, 300 mph, 1,000 mph, 3,000 mph, 5,000 mph and 10,000 mph.

Each of these developments held the promise of a successful landing system during its concept or evolution, but all fell short of the goal either in the execution of the concept or in delicate advances in the equipment or in the frequency. However, several of these systems have been used for approaches even to about 200 feet.

Microvision Attraction — Generally speaking, the proponents of the microvision (10,000 to 100,000 mph, at present only 25,000 mph) offer the greatest hope for the eventual solution of the radio part of the problem. Technicians worldwide are the topnotch people for projecting a radio part of the system that is more nearly controlled to the desires of the display and operator than are the techniques at lower frequencies.

Next, of course, we should question whether the danger radio is actually what solution is best. We are not certain, for example, that the path of the radio signal should be a straight line, or whether it should have exponentially new frequencies—and if it does have, where does the line start where does it end? Similarly should the locality be perfectly straight or should it start with curved approaches leading to a straight line down the runway?

The use of the radio altimeter has provided a first-cut answer too. Although much controversy in this technique was shown a few years back, altimeter has proved successful. The altimeter measures height and a first-cut computer determines rate of descent so that the rate of descent is adjusted to touchdown, thereby rendering a fixed path. However, the radio altimeter increases the height of the aircraft above the object over which it flies.

If perfectly smooth terrain could be provided along all approach paths the radio altimeter and first-cut computer might be used as ideal solutions. Lack of uniform terrain contours in the runway threshold region and the fact that the altimeter is called upon in the final phase without assurance that it is functioning is a serious obstacle to its operational use.

Visual Aids—When electronic aids failed to produce a landing system after many years and millions of dollars, the visual people came up with such schemes as P-40, approach lights, and runway markings. After a decade of experiment and controversy on approach lighting, it appears we are adopting a hybrid system with the full visual

idea that lights simply do not present certain types of poor visibility for any great distance.

Even though the lights provide an apparent visual transition for the pilot from the instrument landing system to the ground, the pilot still is unable to see the runway, his field of view is decreasing into a black hole. In past years, certain geometric configurations of straight lines as a runway, the pilot is supplied with visual reference data that provides location and alignment signals about eyes to guide him in tracking the wheels to the runway and in steering the aircraft into the center line prior to deceleration to landing speed.

Another attempt, a head-down one, is to equip the eyes of the pilot with a sensory other type of line guidance. This is a radio and has received much attention in England and in certain parts of the United States where it has been installed experimentally at considerable expense. Generally, radio has had its shortcomings. The tremendous amount of energy necessary to "burn off" the poor visibility is not only expensive but somewhat hazardous to the aircraft.

Cockpit Instrumentation—Many feel, and with justification, that the pilot has to much to do during an approach and landing, that the introduction of a television in the cockpit area to the instrument landing problem.

The pilot is compelled to watch (at

least) the introduction of the nose pointer meter, the directional gyro, and the horizon instrument. As the nose pointer meter points toward the center of the instrument, the pilot glances to the directional gyro, hoping to find out how much it has moved toward the correct heading since his last visual sample, and thence to the gyro horizon to make certain that the pitch and roll are appropriate.

The confusion caused sampling and note deviation is extremely trying to a human pilot, particularly because it comes at the end of his runway, after he has been told in such a tight time to the final minutes and perhaps 15 to 20 hours for military operations.

Flight test data, such as the Sperry Space Radar, Collins Integrated Flight System, and Bendix Omega One can now do much or all of this computing for the pilot, giving him one-to-one approach instructions on a single instrument.

Synthetic vs. Perceptual—These flight direction systems are termed synthetic because it is that the only guidance the instrument. Certain paths in the synthetic approach suggest that the pilot should be in a more familiar line. The Collins IPS attempts to present a picture of what he will see with several synthetic instruments.

It is possible a flight instrument could be developed to give the pilot a mental image of his flight conditions with as

great speed as the man. If it could be done continuously and without deception, great strides could be made in active solutions for landing. The potential addition of such features as altitude, speed, pitch, movement of boundaries, object motion and depth, has not yet been demonstrated. But this area of instrumentation offers much promise.

The present approach is a seriously complicated because it involves pilot psychology and is subjective in its evaluation by each pilot. A trained instrument pilot actually may do more with a synthetic display than with a synthetic display. If national displays offer the answer to landing instrumentation, the forthcoming generation of pilots may find the solution more pilot.

The flight test data of present, which has been trained with the conventional techniques.

Autopilot and Autopilot—The aircraft itself has been modified in some instances to make it easier to land under instrument conditions. Such things as automatic nose-wheel steering, direct landing gear, instrument programmed flight, controlled landing, and various other means have been tried.

The automatic pilot has rapidly become an integral part of the aircraft, has appeared in all forms, from displacement gyro and rate gyro, with controls that are displacement in action, rate in action, or purely indication of the manual control system.

The automatic pilot has made the aircraft easier to control, which has been its main reason and has been its main reason for its development. However, it is not always greater autopilot capabilities. Human factors are involved in the autopilot. Human factors are involved in the autopilot. Human factors are involved in the autopilot. Human factors are involved in the autopilot.

The Human-Not to be overlooked in this 10-year review is the pilot himself. You often hear his name spoken and told that the solution "will be available shortly in block No. 11." Human engineers and psychologists have been working more and more attention to the pilot in this critical phase of flight.

Such problems as fatigue, mental ability, physical coordination, visual,

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1/8" MECHANICAL

3/8 DIFFERENTIAL

from

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- Operates in working order at 1,000' min. altitude
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When you call for the Ford 1/8" differential, you'll find it's the first instrument line of latest quality gear differential addition. Engineered to blend reliability and economical maintenance, this highly reliable and powerful extreme accuracy in reliability and selective adjustment, while functioning with maximum freedom and flexibility.

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with a

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MET-L-MATIC

propeller by

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The Met-L-Matic propeller is unique in one class previously because of its design features, which greatly reduce maintenance costs. Only the Met-L-Matic propeller features a unique design feature that allows the blades to be changed from constant speed to constant speed without the need of changing the propeller. Because blades are so strong and strong, are maintained and being tested in a greatly reduced time. As a result, the propeller change is smooth and efficient. And the savings offered in maintenance for the Met-L-Matic propeller is the only propeller in the Met-L-Matic class.

Check these features:

- Blade-in, blade-out—constant speed—changing speed—no disassembly required
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Play with McCAULEY's MET-L-MATIC propeller. You'll find it's the first instrument line of latest quality gear differential addition. Engineered to blend reliability and economical maintenance, this highly reliable and powerful extreme accuracy in reliability and selective adjustment, while functioning with maximum freedom and flexibility.

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Utmost Strength in an Emergency



Conforming with Type
MA-1 of MIL-R-2326 (CSAF)

The new Pacific Harness Reel as incorporated an entirely new principle of operation as well as being designed to meet the strength requirements necessary by high speed jet aircraft and wire needed analysis at radius.

The reel easily withstands an ultimate load of 4,000 pounds and at the same time is lighter, smaller, and much more versatile in installation. Film is protected against being thrown in any direction and the reel remains fully open, successful acceleration of the pilot, yet the reel permits comfortable movement in performing regular duties.

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New Bulletin

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NEW AVIATION PRODUCTS



SEMI-AUTOMATIC wire stripper and cutter

Machine Cuts, Strips Wire in One Operation

Single-operation cutting and stripping of both ends of insulated wire is accomplished with a new semi-automatic production tool. The Model 1 cutter stripper is more than five times as fast as hand operation and three times as fast as manual single-end cutting and stripping, says its manufacturer, who also states that unoperated operators can produce up to 2,000 stripped lengths a hour. The wire is pulled through to the desired length, foot pedal depressed, and the rest of the action is automatic.

The machine handles solid or stranded wire, insulated with plastic, asbestos, nylon, Teflon or braided glass in cross-section 1/8 inch to 1/4. An individual, easily replaced, tooth removal cut edge is used for each specific size. The maker claims that this is the only automatic stripping machine that removes glass braid without damage and completely from stranded wire.

The new cutter-stripper is an iron steel, designed for numerous concrete uses. Its output is said to compare favorably with more expensive fully automatic machines, except for very large production runs. Price, with set of cartridges for 18-gauge wire, and foot pedal control are available at basic and length size \$194.

Technical Service Co., 3310 Cantabria Ave., Los Angeles 64, Calif.

Power Press Eliminates Need for Die Sets

A new machine produces power press is said to eliminate the need for die sets. Known as the Power-Dr press unit, the machine takes powder and dies of any shape or extension which are automatically aligned to opposing men and holder recesses.

The Power-Dr takes up less space than conventional bench presses. Its

operator targets use of several in series for simultaneous machining pattern in forming operations on large diameters which would otherwise require much longer dies and punch presses.

The tool is available in a bench or potential press, or as an operator's location for Semicon-Turn lathe working units. It is a self-contained machine, with 18-in. standard stroke, 7 to 6-in. shot height, 200 strokes per minute operation.

Southern Tool & Machine Products, Inc., Kent, Pa.

Spray System Boosts Efficiency of Cutting Oils

A spray system designed to afford efficient application of cutting oils and drawing compounds to boost cutting tools, speeds, and tool life has been developed by C. A. Norgren Co.

Designed Spray-Lube, the system's flexibility permits the spray to be applied to the work area from any or varied direction and to as many points as necessary to cover thoroughly the critical areas of contact between cutting tool and workpiece. It is reported French divided oil spray reduces friction and heat, lessens tool temperature and longer life.

Individual nozzles at each working valve is provided. Character of spray can be controlled by simple adjustment of air pressure and liquid pressure regulators.

C. A. Norgren Co., 3455 South Flinn St., Englewood, Colo.

ALSO ON THE MARKET

Non-experts usually can be trained quickly in magnetic-chuck air gauging units with Scotch double-control type No. 400. Sheet strip of tape is applied on table's grommet surface, protective paper is peeled off either adhesive surface of tape, sheet to be surfaced is placed on adhesive surface, which grips it securely. Manufactured Mining and Manufacturing Co., 908 Ferguson St., St. Paul 6, Minn.

Toolless assembly lines offer 40% weight saving over conventional die, table, or crane, are easier to install. They are now being test flown on military aircraft and by two airlines and have been ordered for an actual 1953 aircraft. Components are it is prepared to make them in six to ten days—Globe-Tek and Robley Co., 10 Kensington Plaza, New York.

nose for trouble



The big black nose of the CP-100—and what's inside it—is truly a work of art. For it identifies the all-weather interception from the day fighter and, in the case of the CP-100, as General's Aerial Defender against bomber attacks across the North.

The "sniffer"—a complex mass of radar and electronic equipment—is designed to guide the CP-100 MA. It's amazingly in its target, lock on and stay on it with a formidable armament composed of rockets and guns. The effectiveness of the search and fire control system is being demonstrated almost nightly during mock interception exercises by RCAF CP-100 squadrons based at various points.

With its two Chinooks, also designed and produced by AVRO Canada, the CP-100 MA has a greater range and more power than any other fighter intercepter in service anywhere. The Chinooks also provide the Chinook Section 5, the intercepting day fighter. In service today.

For detailed description, please visit our booth at 2000 Canada.

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TECHNOLOGY



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FINANCIAL

Airline Earnings and Cash Flow

	Operating Expenses —1954—	Net Income —1954—	Per Share Data	
			Earnings	Total Cash Flow
American	\$2.1	\$0.8	\$4.40	\$6.70
Boeing	2.1	0.1	4.00	5.00
Delta	2.1	0.1	3.50	3.50
Eastern	2.1	0.1	3.50	3.50
Northwest	2.1	0.1	3.50	3.50
Southwest	2.1	0.1	3.50	3.50
TWA	2.1	0.1	3.50	3.50
United	2.1	0.1	3.50	3.50
Western	2.1	0.1	3.50	3.50

NOTES: 1) Data as reported for May 1954.

2) For year ended June 30, 1954.

3) Includes depreciation charges and net income.

4) Delta.

SOURCE: Company reports.

Airlines 'Find' Cash in Writeoffs

There's lots of money in depreciation—Funds generated by aircraft amortization often far exceed net income.

Airline operations have reached an era where they combine an inherent increase of strength not always apparent in reported earnings. This is proven in the heavy "non-cash" deductions generated by depreciation and related charges which do not represent any immediate cash outlay.

Since World War II, the airlines have made substantial additions to their equipment accounts. The major line domestic and international airlines increased their total assets from \$575.5 million at the 1946 year-end to \$1,355 million at the close of 1953. During the seven-year period, net property accounts—mainly flight equipment—have increased from around \$226.5 million to more than \$553 million.

Net Worth Strengthened—In equipping its equipment fleets, the airlines had to obtain considerable new capital funds to finance its program. Such financing has been accomplished through the issuance of new equity securities and debt obligations. Most of the debt has been of a self-liquidating nature paid with private lenders such as insurance companies and banks.

In that process, coupled with increased earnings, equity or net worth positions have also been strengthened and bolstered by considerable margins. For instance, the same group of airlines that had a net worth position of about \$212 million at the 1946 year-end, had more than doubled this

to around \$510 million by the 1953 year-end.

Capital Base—The net effect of these major injections has been to place the capital base of the airlines on a much higher plateau than at any time in the past. This places the group in a much better position to undertake any subsequent major capital expenditures with little, if any, recourse to new equity financing.

The self-generation of funds has now developed into a favorable proposition, assuming a major impact on the industry's future financial development. The internal provision of funds often primarily through depreciation cash flows. These net deductions made before net income is determined but they are not "out of pocket" cash expenditures. Accordingly, they represent additional cash funds which can and will be applied for such purposes as acquiring new equipment, retiring debt, increasing working capital, and paying dividends.

High Cash Flow—"The airlines' tremendous equipment expansion has created better capable of generating non-cash charges of significant proportions because evident a 1953 published accounts. The accounting firm AVANTAGE WENTZ compilation reveals the magnitude of depreciation charges as compared with reported earnings for last year. It can be seen, for example, that while United reported net earnings of \$3.28 per common share, the

addition of depreciation charges helped make the "cash flow" three times as great, at \$10.31 per share.

With many of the major airlines completing their current equipment acquisition programs this year and next, depreciation charges should rise even more sharply. They further augment "cash flows" above and beyond reported earnings.

Most airlines use a seven-year period over which to amortize their assets in reporting to stockholders. However, for its purposes, in recent years United has utilized accelerated amortization techniques using 50% of cost over a five-year period.

Big Five Examples—A number of examples illustrate the immediate trend toward depreciation.

American's 1954 depreciation charges will probably reach \$21.5 million as against \$18.7 million for last year. Despite the addition of its new DC-7 fleet in 1951 and a new year, expensing a \$40 million investment, which should begin to decline in 1955 and in subsequent years, much below current levels as the older equipment is written off the books.

Eastern, which shows a four-year depreciation period to stockholders, is expected to charge off about \$14 million to depreciation in 1954 compared to \$18 million in 1953. A somewhat higher figure is expected for 1955.

TWA will have a non-cash dip in depreciation this year to \$13 million as against \$13.5 million in 1953, but will be expected to rise in 1954 as the factor in 1954 million in 1955.

United is expected to increase its depreciation charges to \$24.7 million in 1954 as against \$17.3 million in 1953, rising sharply to \$30 million in 1955.

The "Big Five" are expected to generate depreciation cash flows of about \$27.5 million for the three-year period to end in 1955. The total back internally generated funds should at the same time write down on the books a healthy part of the new DC-7 and Super Constellation fleet being introduced in 1954, all of the other aircraft installed in service during the earlier years.

With the widespread introduction of jet transports into commercial domestic service of land, air or even water routes, the airlines may not be called upon to make substantial new capital outlays for some time to come. In the interim, as long as depreciation charges load older assets, are covered by operating revenues, the industry should be able safely to amortize its outstanding debt, provide for retirement expansion programs, and in time probably be more liberal in dividend distributions to its shareholders.

—Selig Altschul



IN REPERATION for end of strike, AA announces new equipment to help in routine phase in ready-to-go condition.

Truce or Peace? American Strike Ends

- Airline restores full schedules as arbitrator gets 3-hr. flight-time issue; his decision will not be binding.
- Pilots agree to resume westbound nonstop service; carrier will not press damage suit for 60 days.

By Richard Rabanias

American Airlines is back in full operation this week for the first time in 25 days. But as one except the strike itself was optimistic but wary as to whether its operations might encounter unexpected problems.

A crippling 25-day-old strike called by Air Line Pilots Assn. in flight operations of the daily eight-hour flight-time rule was terminated temporarily at midweek as participants signed a truce and named a neutral arbitrator to study the live issue.

He is David L. Cole, labor mediator recent from Paterson, N. J., and one-time director of the Federal Mediation and Conciliation Service. Cole has been given no deadline to assume the situation. His recommendations are not necessarily binding, since the issue now is a certified arbitration.

ALPA president Clarence N. Sims urged the arbitrator "to trace" the strike and the union will be free to strike again if no agreement can be reached on the basis of Cole's recommendations. ■ DC? Nonstop-Milewide Ameri-

can had its three westbound DC-7 nonstop transcontinental flights scheduled at 3 hr 15 min, in operation by the second day of resumption last week. There are flights that touched off the strike of 1,240 American pilots against the nation's largest domestic airline.

The strike agreed, however, to delay for 60 days any action on its \$1,240,000 damage suit against ALPA (Aviation Week Aug. 9, p. 38). The court approved and the case now is scheduled to be heard Oct. 21.

The suit filed with Southern New York District Court, originally was scheduled for January 34. American is asking \$1 million for "comparative damages," estimated at a rate of \$750,000 per day. This was planned to arrive as the strike progressed.

The remaining \$750,000 of the suit was brought by AA for alleged "illegal activity on the part of the union" in breaking its contract with the airline.

■ Pilots at American-Milewide from the postponed suit after pilots agreed to by the airline and ALPA were

- Operation of the disputed nonstop transcontinental flights.
- No pilots will be scheduled on immediate stops of more than eight hours.
- Pilots went back on American's payroll effective Aug. 25.
- Pilots would return to duty as they are required without loss of seniority and without discontinuity.

Agreement between both factions came in a hurried two-day conference called by NMB mediator Laurence Edwards after several conferences broke down sharply the previous week (Aviation Week Aug. 24, p. 18).

■ 54% Question—The first day of its resumed operation, American had 45% of its equipment in action. By the second day, this increased to 74%.

The airline's immediate problem was ground transportation. Equipment had to be arranged so as to be in the proper place for the first day's operation. The 1,831 transcontinental flight engineers and mechanics, according to airline had all had to be released. As airline spokesman said it was probable that the company would lose some of its former employees because of the time.

Two-week notices sent out to the company's 11,571 other employees, including president C. B. Smith, were immediately rescinded. The dispute was slated to save AA \$7.8 million a month. Reversal lost as the strike was

DURANICKEL

may easily provide the spring properties you need in a corrosion-resisting alloy!

You might look a long time before finding another alloy with all the advantages of Duranickel.

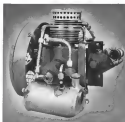
A wrought alloy, Duranickel is age-hardenable, or capable of having its hardness and strength increased by thermal treatment—and has the dependable corrosion resistance of Nickel.

And that's only the beginning! You can figure for yourself just how valuable Duranickel could be for a spring application of yours when you consider its other principal characteristics:

- uniform spring properties at temperatures up to 600°F
- high fatigue strength and endurance limit for nonferrous corrosion-resisting materials
- ready availability

As a typical example of Duranickel's usefulness, let's examine briefly the new Kilde 4-stage compressor shown above.

Developed for pneumatically-operated airborne equipment, the lightweight compressor has neither connecting rods, wrist pins nor other components required by conventional design. Instead, a crank-shaft-riding cam simply pushes the piston into its cylinder. A notch yoke and sliding rod reverses the first piston while compressed air from preceding stages retracts the others.



40000 (50000) delivers big volume at high altitude. At 20,000 feet this 4-stage duplex air compressor delivers three square inches of free air compressed to 2,000 psi. In one hour delivery of a cubic foot of free air compressed to 2,000 psi can be maintained at high altitude when inlet air is pre-cooled. The compressor weighs only 15 pounds, has four-stage value of Duranickel, and Duranickel valve springs, or lower during of similar value. Plans courtesy of Kilde Kilde & Co., Inc., Danbury, N.Y.

For the disc valve in the first stage which is automatically shaped and then heat treated, the design engineers of Walter Kilde & Company, Inc., specified air-hardenable Duranickel. They also called for Duranickel for valve seat springs.

Duranickel is well able to withstand the high temperatures encountered in meeting the severe requirements. It is not affected by moisture squeezed out of the air during compression. And it affords high strength to prevent warpage.

Put Duranickel down in your book for workability, too. It can be hot-worked, forged and cold-worked.

It is most readily machined in the annealed condition, and a commercially measurable in other conditions at hardnesses up to 375 HBIN.

Duranickel can be joined by commonly-used welding, brazing and soft soldering processes, including inert gas metal arc welding.

You'll find detailed engineering data on Duranickel (and its companion alloys, Duranickel "B" and Permalloy®) in Technical Bulletin T-32, "Engineering Properties of Duranickel." A copy is ready and waiting for you. Write us for it.

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Tomorrow's Aircraft...Today!

Some facts about the

famous AVRO VULCAN bomber

Several developments were possible. Each succeeding year brings its crop of new designs, many of which are now being developed in the years of production. It is the result, the new aircraft will have further development, a design which will keep it in the top line after its former competitors have gone out of production.

Back in 1945 was the Aero Vulcanair in World War II. And only an aircraft in the quality Aero Vulcanair, the world's first jet fighter bomber was a super priority production for the Royal Air Force.

Build-up development on the Aero Vulcanair was not a simple thing. First, it is a completely simple design of exceptionally clean lines (no tail fin, no flap, no door, with bomb bay, fuel, engine and maintenance carried within the fuselage and wings, the engine doors and low wing loading guarantee great speed and great manoeuvring performance in all circumstances.

Secondly, the Aero Vulcanair is designed to use even more powerful engines when they become available. And they can be installed without major structural alterations. To the Royal Air Force this means better performance in hand range and altitude with the same aircraft. 'Vulcanair' development will keep the Aero Vulcanair status of tomorrow's progress for years to come.



A. V. Roe & COMPANY LIMITED, Manchester/England



MEMBER OF THE HAWKLEY GROUP (HAWKLEY, ... AND WORLD LEADER IN AVIATION



A.A. SMITH: End is optimistic.



A.L. SMITH: This is 'a man'.

estimated in the strike at \$18,500, 000.

The American strike was the second largest in airline history. From World War II's war fight with ALPA in 1946 lasted 26 days. The strike of National Airlines pilots in 1948 lasted a little over two months, but NAL was in operation within a week after the pilot without began.

► **ALPA Position:** Several days before the company and union came to their basic agreement, the American Airlines and American Airlines, representing 1,000 stewardesses, announced that American's pilots in the strike, the CAB had to revoke ALPA's operating certificate.

The association charged American with intentional failure to provide an air service and with failure to process the dispute with its pilots in accordance with the Railway Labor Act.

We do not like our position with

respect to the dispute between American and its pilots," Kenneth K. Green, Jr., ALPA president, said. "We do, however, believe that the company should and could have prevented the complete cessation of its air operation and should and could have provided the second level of 1,000 stewardesses and other employees."

The case in the pilot's strike affects only three daily flights out of American's daily total of 366, or less than 1% of its entire operation. Before the strike, the pilots association made frequent public announcement that there could be no strike if American would operate those three flights within the eight-hour rule while the dispute was processed under Railway Labor Act procedures.

"American refused to do that and to grant 366 flights even though only three were needed."



RAMP EQUIPMENT was moved in haste by relief workers meeting back-to-work signal.

CAB Lists Findings In Three Accidents

National Airlines probably caused three U.S. airline accidents, Civil Aeronautics Board reports. The accidents, which resulted in some injuries but no fatalities were:

► **Northwest Airlines' Lockheed 1949 Super Constellation** that crashed on emergency landing at McChord AFB, Tacoma, Wash., Sept. 6, 1955, while enroute to Chicago. Several of the 26 passengers were injured. Shortly after takeoff the plane's No. 3 engine was cut because an overspeeding prop would not feather. Three No. 4 engines were feathered because of high engine oil temperature. Landing was made with insufficient hydraulic pressure in the brakes system to extend the landing gear fully in the time available.

A contributing factor, the Board says, was the design of the hydraulic system that did not permit use of the available pressure in the primary system for that purpose. Functional failure of No. 3 propeller governor was due to frozen turbine pinions. Lack of adequate supply for No. 4 engine could not be determined. Landing gear oil valve was tested incorrectly, resulting in insufficient hydraulic pressure.

► **Pan American World Airways' Boeing 377** lost its No. 4 engine and propeller after little warning about failure to Wide Island from Honolulu, Dec. 5, 1953.

Control was separated after losing considerable altitude and the plane crashed in Johnston Island. None of the 35 persons aboard was injured.

The Board investigation examined the severe crew irregularities for their action in handling the accident.

Probably cause of this accident, CAB finds, is propeller blade failure resulting in vibration that tore the engine from its mount. PAA has explained the airplane blade root in favor of a model plant type.

► **Continental Air Lines' Convair 340** made an emergency wheels-up landing in a barren field shortly after takeoff from Midland, Tex., May 16, 1954. Two of the 11 persons aboard suffered serious injuries.

Immediately after takeoff the right elevator trim tab pulled out and failed and the tab and became wedged, holding aircraft in nose-down position. The crew was unable to maintain control of the plane.

CAB investigation on the probable cause of this accident was a misaligned installation of the right elevator trim tab after as a result of the airline's use of the manufacturer's disapproved parts catalog as a maintenance reference.

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Successful applicants will attend United's Flight Training Center at Denver, Colorado and receive salary while training.

Write: C. R. Ulrich, Personnel Superintendent, United Air Lines Operating Base, Stapleton Airport, Denver, Colorado.

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AVIATION WEEK—AUGUST 30, 1954

Shortly after coming office, the Eisenhower Administration launched a sweeping program of economy, efficiency and modernization in the U. S. Air Force, as it often agencies. Air Chief Marshal already was working on decentralization plan. Because of the complexity and size of the effort, and a shortage of space, the press has omitted many details of this significant change in attitude and procedures.

The change of American Wings has been conducting a study of the new Air Force, its philosophy and accomplishments, and we have failed to state at the time directing the program. We have decided that American Wings should devote a liberal and special appreciation of space for a more complete report to our readers on this subject. Beginning here today, we start a series on the new U. S. Air Force, especially its management aspects, since government developments have been realized consistently in this magazine from the time to work.

The series will incorporate authentic source material, official statements, progress reports, and authors that will help our readers understand better the day-to-day activities of the Air Force as they are reported at the Pentagon and at our installations all over the world.

Following are extracts from a progress statement made May 25 by H. Lee White, Assistant Secretary of the Air Force for Management, before the Senate Appropriations Committee. The first two paragraphs, however, appeared in the USAF Management Improvement Report for 1954.

—BHW

Management and Operation

By H. Lee White

The Air Force has made substantial progress toward its goal of attaining maximum effectiveness in its operations at a reduced cost in money, manpower, facilities and material.

Not only have many existing deficiencies been isolated and corrected but new ways have been sought to do the same creditable work with ever decreasing resources.

In the face of an onerous budget and a requirement to increase our combat capability, it became more and more evident that the "high lighting" process of accounts considered in the problem presented. . . can be even partially solved through our own efforts to increase effectiveness at a lower cost, the accounting benefits will be of significant value not only to the Air Force but to the American public as well.

CARETAKER CREATED

It has appeared from reviews that approximately \$1,905 billion of funds (including public works) previously appropriated would remain unutilized for specific programs and would, therefore, be available to apply against our fiscal 1955 program.

This means that, for the first time in many years, it has been found possible actually at an early date to coast on a carpenter of substantial unprogrammed funds for the following year. As these funds have been tied up in re-programming and contract cancellation accounts, I have directed that they be placed in administrative account. Already the total of \$1,905 billion has been specifically directed to be placed in administrative account and \$1,660 billion has actually been transferred, as of this date, to the account. The operation of the \$1,905 billion in the financing of requirements for fiscal 1955 has reduced the amount that otherwise would be required for appropriation for the fiscal 1955 program.

I particularly invite your attention to the fact that this is not an unlimited carpenter in the usual sense of failure to allocate funds as programmed. This is a carpenter created out of program reviews and reviews submitted to postpone to the feasible means, the obligations and expenditures. I make such a point of this because I believe that it demonstrates that the Air Force is doing a commendable job in meeting obligations and expenditures only as actually needed.

There has been established an Expedition Reduction Program. This program was initiated on Aug. 30, 1953 and is controlled by the Deputy Chief of Staff, Comptroller and my deputy for budget. A searching inquiry was made and is continuing to be made in various forms of the Air Force to see where savings might be taken which will result in ultimate reduction of expenditures without adversely affecting Air Force programs. The areas selected for study have been assigned to that agency of the Air Staff having competence, whose data are established and the studies are followed up by the Comptroller's office and by my deputies. I would like to indicate more activity during the past year in the area under my responsibility to reduce costs and conserve efficiency.

FISCAL MANAGEMENT

At the end of March 1954, we had completed the audit of a Monetary Inventory Accounting System of all Air Force bases world wide and of all Zone of Interest Air Military Command depots. Inventory accounting system are being designed for each of the overseas depots and are scheduled to be installed by June 1955.

Critical phases of inventory accounting, necessary for the complete control of supplies from the time of acquisition until consumption, are rapidly being completed. When all phases are completed we will have a closed inventory accounting system that will give us a clear picture of our stock at all times. It is a program which we plan to complete in two years.

Monetary Inventory Accounting, supplemented by detailed quantity data on over 1,200,000 items, provides management with accurate information not previously available. We will have dollar totals covering on hand, on order and in progress in each property class. The dollar comparison denominator makes it possible for supply management to know the status of our inventory, when we are heavy, when there is little activity, when we must take action to reduce stocks, cut handling costs and reduce warehouse requirements. Dollar inventory figures will give us stock turnover rates in each sub-property class and will provide basic checks on the comparison of item requirements.

In July 1954, we will install an Air Forcewide general accounting system which will include for the first time accounts for supplies, equipment and fixed assets. Under this system and because of these additional assets accounts we will be able to relate the annual expansion of operations to the funds appropriated for that year. This will be a commendable system accounting system, a first step toward the more complete system contemplated in the Air Force Financial Control Plan published last November.

We are currently testing all of the base level accounting steps of the Air Force Financial Control Plan at those Air Force bases. This plan emphasizes accounting for resources consumed and the cost of our level. Accounting is done and reports are made for all activities for which a manager at any level is responsible. Our commanders-in-chief will receive consistent type statements of assets (Continued on page 66)

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WITH EXPERIENCE IN

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ANALYSIS DESIGN AND TESTING OF ADVANCED FLIGHT

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SHOULD HAVE BACKGROUND IN Aircraft Dynamics or Servo Systems Theory. Advanced degree and minimum of two years in flight control field desirable.

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and expenses upon which to base operating decisions and budget estimates. We at Headquarters will be in a position to compare the cost of operating one establishment against the cost of operating a similar establishment.

Now that we have added the aviation petroleum and medical-dental divisions to the Air Force Stock Fund, a share for an industrial fund to cover all jointing plants in the Air Materiel Command has been approved. This industrial fund will be set up during the next fiscal year. A plan for operating laundry and dry cleaning plants under an industrial fund has been prepared. A laundry accounting system has been outlined and will be developed, tested and installed during the next fiscal year. Other assets susceptible of operation under a working capital fund arrangement are being studied.

MANPOWER AND PERSONNEL

Last year in the presentation of the 1954 budget, it appeared that the Air Force would, with 950,000 military personnel, man an Air Force of 320 wings at the end of fiscal 1954. Actually, under the existing standards and manpower policies existing at the beginning of calendar 1953, the total requirement for the 310-wing force appeared to be 977,000 military personnel, 1,511,000 military personnel for 115 wings to be activated by end of fiscal 1955, and 1,855,000 military personnel for 320 wings to be activated by the end of fiscal 1956.

As a result of the various actions that have already been taken, by the end of fiscal 1954, the Air Force will have activated 115 combat wings instead of 110, together with their auxiliary Air Transport Squadron and several noncombat wings flying aircraft previously considered to be beyond our capability, and we will do this with not more than 955,000 military personnel.

In other words, we will have activated five more wings than were contemplated with a military manpower cost of at least \$2,000 less than was estimated for the auxiliary force, or looking at it another way the estimate for the 115-wing force under the present manpower and personnel policies, at at least \$6,800 less than was considered necessary under the manpower policies in existence at the beginning of calendar 1953.

On the basis of manpower savings already accomplished the Air Force will be able to man 120 wings by the end of fiscal 1955 with not more than 978,000 military personnel.

In other words, they will man that force with at least \$3,000 less military personnel than was estimated under the manpower policies in existence at the beginning of calendar 1953 for the 120 wing and at the same time have these 120 wings at least one year earlier than originally estimated.

At this point in time, and taking into consideration only those cause actions and the results obtained from them to date without considering any additional programs under consideration or additional results coming from the programs already put into effect, it would appear that the Air Force would need 1,018,000 military personnel to man 127 wings by the end of fiscal 1956 and 1,942,000 military personnel to man 137 wings by the end of fiscal 1957. However, the Air Force, military and civilian alike, is fearful of the opinion that the policies put into effect this year and additional policies which are now under consideration, is put into effect during the next fiscal year will result in manpower economies sufficient to remove the apparent deficits for fiscal 1956 and fiscal 1957.

We are working hard and are confident these savings will be made so that we will man the 127 wings by the end of fiscal 1956 with 950,000 personnel and 137 wings by the end of fiscal 1957 with 975,000 personnel. I call your attention to these facts so that the committee will know that additional economies have to be made in man-

power requirements in order that the Air Force be able to attain its goal of manning the full force of 137 wings with 975,000 military personnel by the end of fiscal 1957. I also want to assure you that there is no question but that it will be done.

It should appear self-evident that many actions have occurred in the Air Force this year to economize on manpower when you compare the requirements as they now point to what they were in the past. Some of the actions that have been taken are as follows:

1. The total number of bands originally programmed for fiscal 1954 was 110, to be manned by 4,063 personnel. Under the present program we will have 74 bands with 2,466 officers and men.

2. Manning standards for support functions were reduced in such areas as air police (20% reduction), motor vehicles (9,000 apiece), food service (8,000), and major base quarters.

3. Messroom and work hours of major subcommands were reduced, with resultant savings.

4. At the time the 1954 budget was presented to Congress, the program showed a pilot training rate of 7,200 and funds and space were requested for this rate. Plans implemented during the year now provide for increasing the input into pilot training before the end of fiscal 1954 in order that the input rate may be increased to 7,800 and then will be done within the structure of the budget.

5. An early release policy was established to remove from the Air Force those persons, surplus to the needs of the Air Force, who were engaged in nontechnical skills. Consequently, the training program was geared to replace these people with persons capable of being trained in the technical skills where shortages existed. Under this program persons were to be released during fiscal 1954 in three categories, as follows:

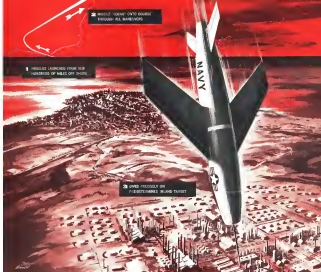
(A) All persons remaining from civilian who had lost six months remaining on their enlistments and who did not desire to reenlist were released. This was done because it was felt that the shedding of these men by a Zone of Interest duty station would take most of the men months remaining, leaving little benefit to be reaped from them. Additionally, releasing them would involve no real money due to a new duty station and then have a short time later. It is better to replace them immediately with men who would serve in the Air Force for five years.

(B) All persons surplus in non-technical skills who showed conclusively they did not have the capability to be considered as a technical area whose development might be released after two years' service. These persons are prevented from reenlisting.

(C) All persons who had served three years of their five-year enlistment and who were engaged in a surplus non-technical area, and who did not desire to reenlist, were released from the service. This was done because it was recognized that there was no point in holding for a year a person who was surplus and who would only come to become surplus after the date that his enlistment expires.

Under the above policies, approximately 15,400 persons due for release in fiscal 1954 have already been released in fiscal 1954 but at a date much earlier than originally due for release. Approximately 61,000 airmen have already been released in fiscal 1954 who were due for release until fiscal 1955, and 7,600 airmen have already been released in fiscal 1954 who were due for release until fiscal 1956 or thereafter. We are also considering releasing an additional group of airmen in fiscal 1954 who were not due for release until fiscal 1955. It can, therefore, be seen from the summary of the policies that we have already implemented approximately 87,000 military personnel have been released in fiscal 1954 who were not due for release until fiscal 1955 or thereafter. We are also considering releasing an additional group of airmen.

(To be continued next week)



Sub-Launched Missile Gives Navy New Striking Power

CONTROL OF RIGIDLY WILD ENEMY

WIDE CAN BE RETRIEVED BEING TESTS

THE STORY BEHIND THE STORY

When a guided missile launched from a submarine launches its warhead into the air, it is held in an altitude course as it approaches the target. It is usually aimed at a specific island target, the ship's nose, and then down to a possible enemy. And when only one of the missiles can be recovered and reused after time for evaluation and analysis, the Navy has a great need for American company.

On both counts, the Navy's Regulus development by Chance Vought Aircraft Inc., is currently in the headlines.

Providing the stability that holds Regulus on its course with a gyro-compassing recovery during its approach to the target is a special design of Autonomic Pilot, named by Sperry. Like its relative, the famous Sperry Gyrocompass, Flight Control, fired by the military's old landing gear, the electronic brain is sensitive to the slightest signal change in the flight path. Under its command, powerful servos or "muscles" of the control system

make minor corrections—by Regulus maintaining through automatic servos at all speeds and at all altitudes.

There's a mighty difference between the automatic controls used by Sperry for this newest guided missile of the Navy, and those provided by Sperry for the Navy's first guided missile back in World War I days. But they're alike in this respect. Both revealed from an unimpaired confidence in skillful engineering, plus specialized experience in electronics and gyroscopes and precision in production.

SPERRY HYDROSCOPE COMPANY



What shape is a quality fastener?

Here is a handful of ELASTIC STOP® nuts. Each has ESNA's familiar red locking collar . . . is self-locking and vibration-proof. Each is a readily assembled, one-piece unit. Each provides positive protection against thread corrosion . . . prevents liquid seepage along bolts. Each is made from the finest of raw materials. Each is exactly controlled as to finished dimensions, class of thread fit and finish. Each is now in use on critical applications, with a record for uniform high quality that is unmatched.

Most of them are standard parts. Some originated as the result of a specific request for ESNA's help with an important fastening problem.

Isn't it logical to call on us with your next fastening problem?

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Please send the following free fastening information:

- ☐ ELASTIC STOP nut bulletin ☐ Here is a drawing of our product.
What self-locking fastener would you suggest?

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